A REVISION OF THE *THECLINESTHES ONYCHA* COMPLEX (LEPIDOPTERA : LYCAENIDAE)

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SYNOPSIS

We revise the taxonomy of four species largely from the Australian Region: *Theclinesthes onycha* (Hewitson), 1865 (=*miskini* auct. nec Lucas), *T. miskini* (Lucas), 1889 (=*onycha* auct. nec Hewitson), *T. albocincta* (Waterhouse), 1903 and *T. hesperia* sp. n. The following new subspecies are named: *T. onycha capricornia* n. (eastern Queensland), *T. miskini eucalypti* n. (north-eastern Queensland), *T. m. brandti* n. (Admiralty Islands), *T. m. feminalba* n. (northen coasts of Irian Jaya and Papua New Guinea), *T. hesperia hesperia* n. (south-western coast of western Australia), and *T. h. littoralis* n. (Esperance, Western Australia). We indicate two new subjective synonmys: *Utica onycha* var. *atrosuffusa* Waterhouse, 1903=*T. miskini* Lucas, 1889 and *Plebeius* (*Theclinesthes*) *eremicola* Röber, 1891 December=*T. miskini gaura* (Doherty), 1891 July, comb. n.; and two other new combinations: *T. miskini arnoldi* (Fruhstorfer), 1916 and *Theclinesthes sulpitius* (Miskin), 1890.

INTRODUCTION

The genus *Theclinesthes* Röber, 1891, as revised by Eliot (1973), comprises two distinct groups both consisting of extremely similar species: the *T. onycha* complex and the *T. serpentata* complex. *Lycaena scintillata* Lucas, 1889, customarily placed in *Theclinesthes*, is, as suggested by Common and Waterhouse (1972), so essentially disparate from the *Theclinesthes* Section of Eliot (1973) that it may be regarded as representing a new genus probably belonging to the *Nacaduba* Section.

In this paper we wish to revise the taxonomy of the *T. onycha* complex which has so far remained elusive. The great variability of all the taxa involved in the complex has not been adequately documented in the recent comprehensive publications on Australian butterflies. In the latest, most authoritative volume by Common & Waterhouse (1972), the most widely distributed species "*T. onycha* (Hewitson)" was not even illustrated, indicating the great difficulty the authors must have had in defining this taxon. The need of revisional work on the complex was stressed by G. A. Waterhouse (1937) and by Common & D. F. Waterhouse (1972). In contrast, the two species belonging to the *T. serpentata* complex: *T. serpentata* (Herrich-Schaeffer), 1869 and *Theclinesthes sulpitius* (Miskin), 1890 **comb. n.**, though very similar, have always been correctly recognised. However, they have long been placed erroneously in the genus *Neolucia* Waterhouse and Turner, 1905, a member of the *Nacaduba* Section of Eliot (1973). Although in some collections we found occasional specimens of *T. serpentata* placed among taxa of the *T. onycha* complex, the *serpentata* complex on the whole raises no serious problems in the present revision.

Fortunately we have had access to all the necessary material known to exist in public and private collections. Not surprisingly, the project has proved to be an exceedingly difficult one: not only are a few species belonging to the complex similar, but they also show a remarkable parallelism in their individual variability in size, pattern and coloration of both sides of the wings in both sexes. Such a variability probably entails genetic and seasonal polymorphisms as well as geographic divergence. Unfortunately, male genitalia are very uniform and useless for specific distinction. Not only was it difficult therefore to define the individual species, but in a few instances there was the problem of deciding if the subspecific specialisation had in fact reached the specific level. On top of all this there is a serious nomenclatural problem. However, we hope that the present paper provides a reasonable framework for further studies on this group.

TERMINOLOGY AND ABBREVIATIONS

For brevity of description the following notations and abbreviations are used. (1) *Size* of the insect is given by the range of forewing lengths. (2) Wings may be divided into *cephalic and caudal halves*, the borderline being the groove running from the base along the middle of the cell and then from the base of M_2 to the termen between M_2 and M_3 in the forewing, and along the cubitus and M_3 on the hindwing. There is often a sharp demarcation of coloration or pattern along these borderlines; for example, in most ♀ specimens the blue marking on the forewing above is restricted to the caudal half. (3) The conspicuous terminal black spots on the hindwing in the spaces between CuA_1 and CuA_2 and between CuA_2 and 1A+2A, the former with an orange lunule basad, are termed together the *caudal spots*. (4) The subterminal pale markings that are usually proximad of, but sometimes around, the terminal dark spots in most of the spaces on the upperside hindwing (and also, sometimes, forewing), are called the *pale lunules*. (5) The greyish or whitish suffusion between the postmedian (main) band and the subterminal line on the underside of both wings are termed the *postdiscal suffusion*. (6) The submedian, median (cell-end) and postmedian bands beneath are usually lined on both sides with dark and then white; this is called here the *dark*, and *white*, *linings*. (7) Individual specimens of the winter form and transitions to it are indicated by "w" and "(w)" respectively.

The following abbreviations are used for insitutions and collections:

AM, Australian Museum, Sydney, N. S. W., Australia
AMNH, American Museum Natural History, New York, N. Y., U. S. A.
ANIC, Australian National Insect Collection, Canberra, A. C. T., Australia
BMNH, British Museum (Natural History), London, U. K.
CM, Carnegie Museum, Pittsburgh, Pa., U. S. A.
EUQ, Entomology Department, University of Queensland, Brisbane, Queensland, Australia
KU, Biology Laboratory, Kyushu University School of General Education, Fukuoka, Japan
NMV, National Museum of Victoria, Melbourne, Victoria, Australia
OM, Osaka Museum Natural History, Osaka, Japan
SAM, South Australian Museum, Adelaide, S. A., Australia
SMT, Staatliches Museum für Tierkunde, Dresden, DDR
USNM, United States National Museum, Washington, D. C., U. S. A.
ZMB, Zoologisches Museum Berlin, DDR
AA, collection of A. F. Atkins, now incorporated into *AS*
AB, that of A. D. Bishop
AS, that of A. Sibatani
BB, that of G. T. Bethune-Baker
CO, that of C. Oberthur
DC, that of D. F. Crosby
FP, that of F. E. Parsons
GM, that of C. G. Miller
GS, that of F. D. Godman and O. Salvin
GW, that of G. A. Waterhouse
HD, that of H. H. Druce
JA, that of J. W. C. d'Apice
JJ, that of J. J. Joicey
JK, that of J. F. R. Kerr
LS, that of J. C. Le Souëf
MM, that of M. S. Moulds
MR, that of J. M. Mosse-Robinson
NQ, that of W. N. B. Quick
R, that of L. W. Rothschild
RF, that of R. H. Fisher
RG, that of R. B. Grund
WB, that of W. W. Brandt.

DIAGNOSIS AND DEFINITION OF NOMINAL SPECIES

The definition of the *Theclinesthes* Section, as given by Eliot (1973) using genitalic characters, ac-

tually applies *only* to the genus *Theclinesthes* (Sibatani, unpublished). Within *Theclinesthes*, the *onycha* complex is distinguished from the *serpentata* complex by the fewer nudum segments on the antennal club (15-19 as against 20-21) and the generally thecline wing shape and pattern on the underside, e.g., the more pointed forewing apex and hindwing tornus and the more or less continuous bands beneath the wings, especially the usually straight postmedian band of the forewing which is, unlike that of the more polyommatine *serpentata* complex, not displaced distad in spaces between M_1 and M_3.

There are four species in the *onycha* complex, which feed on widely different plants: species A feeds mainly on *Acacia* and *Eucalyptus*, species B on the cycad group of gymnosperm plants, and species C and D on *Adriana* (Euphorbiaceae). Species A has been known as "*T. onycha* (Hewitson)" and B as "*T. miskini* (Lucas)", while C had long been confused with A in many collections until Grund & Sibatani (1975) recognised it as a distinct species *T. albocincta* (Waterhouse). Species D has thus far remained unrecognised and unnamed, although specimens of it existed in a few collections; it is named here as *T. hesperia* n.

We now show in this revision that assignment of the two specific names *miskini* and *onycha* must be reversed; thus,

Species A (*Acacia* feeder) = *T. miskini* (Lucas), 1889 *nec auct.*
Species B (cycad feeder) = *T. onycha* (Hewitson), 1865 *nec auct.*

GENERAL REMARKS

SPECIES AND SUBSPECIES

As to the biological entity, emphasis is now shifting from species to local populations (Avinoff & Sweadner, 1951; Ehrlich *et al.*, 1975; Emmel, 1975). Once the species concept is recognised as artificial, the long-standing species-subspecies controversy (Wilson & Brown, 1953; McAlpine, 1972) resolves itself into a question of mere methodological compromises. Thus, a continuous cline is no longer regarded as incompatible with "species" differentiation at its extreme ends; and the nomenclatural and conceptual weight of species can no longer be placed over that of subspecies. Rather, the concept of subspecies falls closer to local populations as a real entity than does the concept of species which is by definition higher in degree of abstraction. In fact, at least in *Theclinesthes*, we find it easier to define subspecies than species. We have thus decided to recognise subspecies so as to establish, through holotypes, a number of fixed reference points for taxonomy in such a highly variable complex as the present one. However, we have mostly restricted our subspecies to the end points of largely continuous geographic variation, thus refraining from virtually equating subspecies to local populations which would destroy the abstract nature of subspecies as a concept. In sum, we have not regarded discontinuity in variation as a necessary criterion for separating taxa, be it species or subspecies.

SEASONAL VARIATION

All four species of the complex exhibit seasonal variation. Throughout the Australian continent most of the butterflies of this complex reared or collected during the cooler months, i.e. April to October in the south and around July in the north, are very different from those obtained during the warmer months, and will be called the winter form as against summer form. Specimens collected during the intermediate seasons and sometimes even in the mid-winter may exhibit gradational variations between the typical summer and winter forms, and the degree of the deviation from the typical form varies individually among those which are collected or reared together. Specific distinctions are sometimes obscured in the winter from, especially in females.

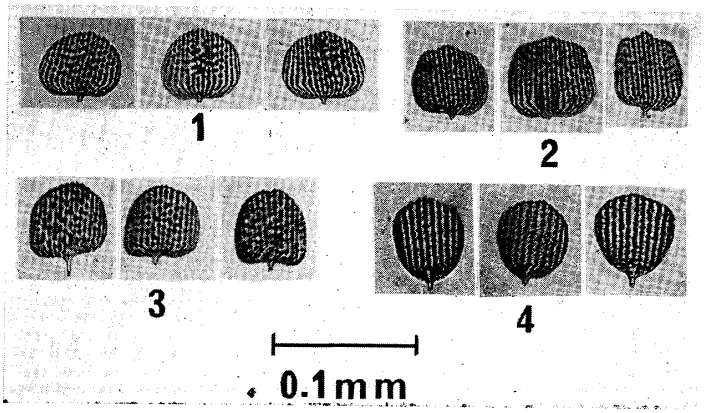
In *Theclinesthes*, the tendency for the butterflies to emerge and fly during the cooler seasons and to show a modified wing morphology, is apparently confined to the *onycha* complex and not shared by the *serpentata* complex. However, in some species of the *Nacaduba* section (Eliot, 1973), e.g. *Nacaduba berenice berenice* (Herrich-Schaeffer), *Prosotas felderi* (Murray) and *Catopyrops florinda halya* (Waterhouse) from the mid-east coast of Australia, there is some indication of winter form specialisation, e.g. the females having larger blue areas on the upperside (Common & Waterhouse, 1972). Similar observations were made by Kawazoé & Wakabayashi (1976) on some polyommatine species from Okinawa including *Euchrysops cnejus* (Fabricius).

Some of the salient features of the winter form of *Theclinesthes*, though not necessarily present in all the individuals of taxa, include: a straighter hindwing termen; a shorter, stubby tail on the

hindwing; clearly chequered, or even white-dominant, cilia; larger, more intensely coloured blue areas on both wings above in both sexes; a more pronounced contrast of darker and lighter areas beneath, the postmedian band and area basad to it in the cephalic half, or bands in general, of the hindwing beneath being darker, and the postdiscal suffusion on both wings beneath being more extensive and often conspicuously whitend; a reduction of the caudal spots above and beneath.

ANDROCONIA

We found that androconia, or battledore scales, were generally useful in analysing the complex, although not necessarily helpful in identification of individual specimens. Scale samples were taken from the basal areas of the spaces between M_3 and CuA_2 on the upperside forewing of male insects, but occasionally the whole forewing was observed under a dissecting or ordinary optical micorscope. The useful characters include the abundance (or total absence), size, shape, colour, number of ribs and nodules along the ribs, and size of the nodule. Except for the first item, these characters pertain to individual scales, and despite the occasional oddities there was a fair stability of these characters among the individual scales in any one specimen (Figs. 1-4). There was some variation among different individuals of the same local population, but in general there were definable common characters for each geographic population. Different characters tended to vary concordantly, but they may very well be subject to separate genetic controls. Usually there was a considerable geographic variation within a single taxon. The considerable variation of these characters preclude the use of androconia as a sole reliable criterion for the identification of individual taxa. No seasonal variation was noted in the androconia.



Figs. 1-4. Variability of androconia. Three scales were chosen at random for each specimen: (1-3) *T. onycha onycha* (Hewitson): (1, 2) Newport *AS* no slide numbers; (3) Lismore area *GM* slide no. S1120. (4) *T. onycha capricornia* n. *paratype*, Brisbane ANIC S1060. See legends for Figs. 114-157 for conditions of photography.

LIFE HISTORY

Apart from the food plants the life histories of the four species of the complex are very similar. Limited observations suggested the existence of some systematic differences in the larval secondary setae among different species, but the extent of their stability remains to be confirmed with more material.

KEY TO TAXA OF THE *THECLINESTHES ONYCHA* COMPLEX

1 Tail stubby, covered by dark cilia, with or without white tip, but without filamentous shaft...2
- Tail medium to long, base covered by dark cilia but with conspicuous filamentous shaft tipped white..... 6
2 Cilia on hindwing mostly dark; forewing tornus rectangular or only slightly obtuse; beneath white linings of bands reduced especially on hindwing.....3
- Cilia on hindwing chequered dark brown and white in blue individuals, more uniformly brown in some dark individuals; forewing tornus often conspicuously obtuse; beneath white linings of bands clearly marked on both wings.....4
3 Small elongate androconia present; ♂ above dark blue-lilac with ralatively narrow dark terminal margin; beneath light or medium grey-brown, postdiscal suffusion on hindwing grey and well developed, usually extending basad..... *T. hesperia hesperia* sp. et ssp. n. (p. 30)
- Androconia absent; ♂ above dark with dull blue scales usually limited to basal half of both wings; beneath brown, sometimes very dark..... *T. hesperia littoralis* ssp. n. (p. 31)

4 ♂ above dark, or dull greyish blue; when blue, dark cell-end bar on forewing clearly marked; androconia absent; ♀ above with blue area without lilac hue, when extensive becoming paler distad, and with pale lunules on hindwing above····· *T. albocincta* (p. 28)

- ♂ above silky blue-lilac; dark cell-end bar on forewing usually absent; androconia present; ♀ above with blue area extensive and intensely coloured, often with lilac hue, not becoming paler distad, and without pale lunules on hindwing above; flying during cooler seasons ·····5

5 Smaller (10-13 mm); ♂ above moderately light blue-lilac with narrow terminal lines; beneath not entirely dark-coloured, usually with extensive postdiscal suffusion merging with a white ground colour; area basad of postmedian band in cephalic half of hindwing often dark brown····· ·····*T. miskini miskini* (winter form) (p. 13)

- Larger (12-16 mm); ♂ above dull blue-lilac to lilac usually with terminal black spots fused with black terminal line on hindwing; beneath generally dark grey-brown, postdiscal suffusion grey and often extensive but seldom becoming completely white····· *T. onycha onycha* (winter form) (p. 5)

6 ♂ above with pale lunules on hindwing·····7

- ♂ above without pale lunules on hindwing ····· 10

7 Hindwing beneath with postmedian band wavy, displaced distad between M_1 and M_3; above ♂ and ♀ rather alike, ♂ lilac with wide dark margins along apex and termen···*T. miskini gaura* (p. 26)

- Hindwing beneath with postmedian band usually straight, not displaced distad between M_1 and M_3; ♂ and ♀ dissimilar, ♂ predominantly dark, blue or blue-lilac·····8

8 ♂ above with blue area not extending beyond 2/3 of forewing; ♀ above usually predominantly whitish·····*T. miskini feminalba* ssp. n. (p. 26)

- ♂ above with blue area extending much beyond 2/3 of forewing with dark terminal line or marginal band; ♀ markings above predominantly bluish ·····9

9 ♂ above with blue areas mixed with black scales and with dark terminal margins 2-3 mm wide; ♀ above with blue markings somewhat greyish and not becoming noticeably whitish distad ····· ·····*T. miskini brandti* ssp. n. (p. 25)

- ♂ above prodominantly dull or light silky blue, blue-lilac or dull lilac; ♀ with blue markings above often becoming pale distad····· *T. miskini arnoldi* (p. 24)

10 Smaller (9-16 mm); ♂ above light or silky blue to dull greyish lilac; hindwing with narrow dark terminal line and usually without terminal spots except for caudal spots; ♀ beneath moderately light, and dark areas not uniformly coloured·····11

- Larger (♂ 10-16 mm, ♀ 12-18 mm); ♂ above dull lilac, sometimes slightly greyish, rarely shiny blue-lilac (winter form); hindwing above usually with black terminal spots in each space fused with black terminal line; ♀ beneath fairly dark, and dark areas uniformly coloured·····12

11 ♂ above dull silky blue, blue-lilac or dull lilac; androconia usually abundant, small, roundish, light brown with large nodules on 11-13 ribs; hindwing beneath with postmedian band usually straight; from northern Queensland····· *T. miskini eucalypti* ssp. n. (p. 21)

- ♂ above pale silky blue, lilac to dull greyish lilac; androconia usually not abundant, large, more angular, colourless with small nodules generally on 12-15 ribs; hindwing beneath with postmedian band usually displaced distad between M_1 and M_3 but may be straight in specimens from coastal areas of Northern Territory; from Australia except for northern Queensland····· ····· *T. miskini miskini* (p. 13)

12 Beneath dark grey brown with white linings often not conspicuous in summer form; winter form beneath dark grey with grey postdiscal suffusion····· *T. onycha onycha* (p. 5)

- Beneath brown with white linings clearly marked but dark linings often obscure in summer form; winter form beneath brown with whitish postdiscal suffusion···*T. onycha capricornia* ssp. n. (p. 9)

Theclinesthes onycha (Hewitson) (nec authors)

T. onycha onycha (Hewitson) (nec authors) (Figs. 1-3, 5-9, 32, 114-118)

Utica onycha Hewitson, 1865: 56, pl. 24, figs. 11, 12. LECTOTYPE ♀ w, here designated, AUSTRALIA (BMNH) [examined].

Lycaena onycha Hewitson; Kirby, 1879: 174 (part).

Utica onycha Hewitson; Druce, 1902: 116 (part); Waterhouse, 1903: 240-241 (part).

〔*Theclinesthes miskini* Lucas; Waterhouse & Lyell, 1914:110(part), pl. 16, figs. 328-330. Misidentification.〕
〔*Theclinesthes onycha atrosuffusa* Waterhouse; Waterhouse & Lyell, 1914: 110, pl. 16, fig. 331 ♀w (nec ♂w). Misidentification.〕
Nacaduba onycha onycha Hewitson; Fruhstorfer 1916: 125 (part).
Nacaduba onycha 〔*onycha*〕 Hewitson; Seitz, 1923: 918, pl. 152i (part).
〔*Theclinesthes miskini* Lucas; Waterhouse, 1932: 174 (part), pl. 23, figs. 16, 16A. Misidentification.〕
〔*Theclinesthes onycha atrosuffusa* Waterhouse; Waterhouse, 1932: 175, ♀w(nec ♂w). Misidentification.〕
〔*Theclinesthes miskini* (Lucas); Common, 1964: 114 (part); McCubbin, 1971: 90 (part), fig. 16. Misidentification.〕
〔*Theclinesthes miskini* Lucas; D'Abrera, 1971: 359 (part). Misidentification.〕
〔*Theclinesthes miskini* (T. P. Lucas); Common & Waterhouse, 1972: 396-397 (part), pl. 39, figs. 16, 16A. Misidentification.〕

Types—Utica onycha Hewitson, *lectotype* ♀w, labelled "Australia" and "type" 〔probably from near Sydney〕 (Fig. 5); *paralectotype* ♀w, labelled "Australia"; both in British Museum (Natural History).

Other material examined — AUSTRALIA: ? Queensland — "Morton Bay" 1♂w *Bates-GS* BMNH. New South Wales — 24 km W of Grafton 1♂ 27. i. 1976 *JA*; Rapville near Casino 2♂w 13. viii., 11. ix. 1973 *GM*; "Calumet" 43 km from Binnaway 1♀ 11. iii. 1934 AM; Coonabarabran 11♂ 1♀ 7.-8. i. 1963 *MM*; Ebor 1♂ 29. i. 1946 *MR* ANIC; Gunnedah 1♂ 28. ii. 1943 AM; Murrurundi 6♂ 8. iii. 1943, Tabulam 2♂ 25. xii. 1912, ANIC; Manning River 5♂ 8♀ 23. iii. 1913 *GW* AM; Port Stephens 1♂(w)* 1♂w* 12. ix. 1970 ANIC; Newcastle 2♂ *HD-JJ*, Hunter River 1♀, BMNH; Toronto 2♂ (3. iv., 2.-5. v.) 1920 AM, 1♂* 27. iii. 1964 ANIC; Swansea 6♂ 8. ix. 1942 AM, 1♂ 2♀ (23. iii. 1941) 4♂w (8. iv. 1942) CM; Bathurst 1♂* 19. xii. 1970, Barryrenie 2♂ 4♀ (23. iv. 1959, 25. iii. 1960, 18. i. 1961), ANIC; Blue Mountains - 1♀ xi. 1906 BMNH - Blackheath 1♂ 16. xii. 1968 *AS* - Springwood 5♂(w) 11.-20. ix. 1933, Lawson 1♂ 3. xi. 1898, *GW* AM - Hawkesbury Lookout 2♂ 11. ii. 1967, 20. i. 1968 *AS*; Mulgoa 1♀ 12. iii. 1954 ANIC; near Gosford - Wamberal 3♂ 27. v., 4. vi. 1973 *RG*, 3♂(w) 26. viii. 1973 *AS* - Terrigal 1♂ 9. ii. 1942 CM - Woy Woy 1♂ 1♀ 15. iv. 1898 AM, 10♂-/(w) 5♀-/(w) (5. iii.) 1♀ (29. iii.) 4♂w 3♀w (30. viii.-16. xi.) 1952, Ocean Beach 10♂ 6♀ 10.-21. i. 1952, Narara 1♂ 27. iii. 1954, *MR* ANIC - Ettalong 1♂ 12. iv. 1974 *AS* - Peats Ridge 8♂ 30. xii. 1972-18. iii. 1973, Kulnura 1♂ iii. 1969, *RG*; near Sydney - Ku-ring-gai Chase 1♂ 14. iii. 1970 *AS* - Whale Beach 1♀ 10. v. 1935 AMNH, 1♀ 11. iv. 1941 CM - Avalon 1♀w ix. 1933 AMNH, 1♂ 17. v. 1943 CM, 1♀ 19. i. 1962 *MM* - Newport 2♂ (-) 2♀ (on *Macrozamia spiralis* emerg. iii. 1960) AMNH, 2♂ (larvae on *M. communis* emerg. 21., 24. ii. 1969) 2♀* (19. i. 1965) ANIC - Bungan Head 2♂* 1. iv. 1963 ANIC, 3♂ (31. xii. 1967, 29. xii. 1969) 1♀ 13. ii. 1971 *AS*, 6♂ (9. iv.-1. v. 1971) 2♂ (18., 26. iii. 1972) *RG* - Narrabean 1♂ 17. iii. 1917, 1♂ (emerg. 14. iv.) 5♂w (on *Macrozamia*, pup. 12. iv., emerg. 26. v., 1. vi.) 1♀ (15. iv.) 5♂w (19., 20. viii., 2. ix.) 1933 *GW* AM, 1♂ 11. xi. 1933 *MR* ANIC - French's Forest 1♀* 10. i. 1970 ANIC - Collaroy 16♂w 11♀w (12. viii.-2. ix.) 1♀ (2. ix.) 8♂-/(w)/w 5♀-/(w)/w 1933 *GW* AM, 1♂ 1♂(w) ix. 1933 AMNH - Mosman 1♂ (i. 1908) 1♂ 1♀ (-) AMNH - Killara 1♀ 17. ix. 1933, 1♂ 26. i. 1934, *GW* AM - Sydney 1♂ *JJ* (G. F. Mathew) *GS* and *HD-JJ* BMNH, 1♂ 1♀w 3♀ 25. iv. 1941 *GW* AM - Frazer Park 3♂ 28. xi. 1946 *MR* ANIC - Tempe 1♂(w) 1♀(w) 3. iv. 1908, Como 6♂ (13. i., 10. ii., 9., 24. iii. 1900) 2♂ (23. iii., 21. iv. 1901) 1♂ (9. iii. 1902) 1♂(w) (29. viii. 1908) 1♂w (27. ix. 1919), Royal National Park 1♂ (7. iii. 1907) 1♀ (28. iii. 1932), *GW* AM - Menai 1♀ 19. vi. 1959 *AS*; Stanwell Park 1♂* 13. i. 1970 ANIC; Depot Beach 17 km NE of Batemans Bay 1♂ 17. ii. 1968, 13♂ 11♀ (12. i.) 3♂ 2♀ (22. ii.) 1♀ (22. iii.) 1♂(w) 9♂w 10♀ (24.-28. v.) 19♂ 7♀ (emerg. 20.-28. i.) 1♀ (emerg. 13. iii.) 1♂ 3♂(w) 1♂w 3♀(w) 2♀w (larvae on fronds of *Macrozamia communis*, emerg. 19. vi.-1. vii.) 1969 ANIC; Moruya 1♀ (29. iii. 1903) 1♀w (24. viii. 1904) 2♂ 1♀ (10. iv. 1905) *GW* AM, 1♂ 1♀ 22. ii. 1969 ANIC; Broulee 1♀ 24. ii. 1962, 1 km S of Mt Tinderry 1700 m 6♂ 19. ii. 1969, 5 km S by E of Tallong 4♂ 27. ii. 1969, ANIC; Central Tilba - Mt Dromedary 1♂ 2. ii. 1966 *DC*. Australian Capital Territory—Mt Ainslie 1♂ 1. iii. 1972, 1 km N of Picadilly Circus 1200 m 1♀ 25. ii. 1969, ANIC.

In the BMNH there are four specimens (Kirby No. 1-4) which were listed by Kirby (1879) in his "Catalogue of Hewitson Collection" as *Lycaena onycha* Hewitson from Port Denison, Queensland. They are labelled: No. 1 "Port Denison", No. 2 "Queensland", No. 3 "Australia", and No. 4 "Australia"/

"type" (Fig. 5). Nos. 1 and 2 are ♀♀ of species A and Nos. 3 and 4 are ♀♀ winter forms of species B (see p. 3 for A and B). Hewitson's original description and figures agree with No. 4 completely, and with No. 3 less perfectly, but differ from Nos. 1 and 2 significantly. It is not certain whether Kirby Nos. 1-4, Nos. 3 and 4, or No. 4 alone were present before Hewitson when he described *Utica onycha* in 1865. Therefore, *onycha* syntypes are ill-defined. But No. 4 is obviously the holotype or the first candidate of lectotype of *onycha*. We treat here Nos. 3 and 4, belonging to the same seasonal form of the same taxon and having similar label data which agree with the locality given in the original description, as syntypes of *onycha*, and leave Nos. 1 and 2 as uncertain as to whether they also were included in the syntypes; and we designate No. 4 as lectotype of *onycha*. The "type" label attached to No. 4 is not substantiated by any published record, and the question remains unresolved as to who attached that label.

This designation unfortunately leads to a reversal of the sense of the two nominal species, *T. onycha* (Hewitson) and *T. miskini* (Lucas), because the latter name must be used for species A, as is shown below (p. 18), rather than B to which it has been customarily assigned.

Although the type locality of *onycha* is "Australia", we believe that the lectotype represents a winter form ♀ of the population from near Sydney or southern N. S. W. We show in Fig. 6 a ♀ specimen from near Batemans Bay which closely matches the lectotype.

The two species A and B were for the first time recognised as being distinct by Waterhouse & Lyell (1914), when they pointed out that those taxa fed on widely separate food plants. Unfortunately, they respectively applied the two names *onycha* and *miskini* to biological species A and B as defined by their food plants, so that since then these two species have been known under reversed nomenclature. The mistake has escaped correction mainly because of the difficulty in clearly distinguishing adult specimens of the two biological species.

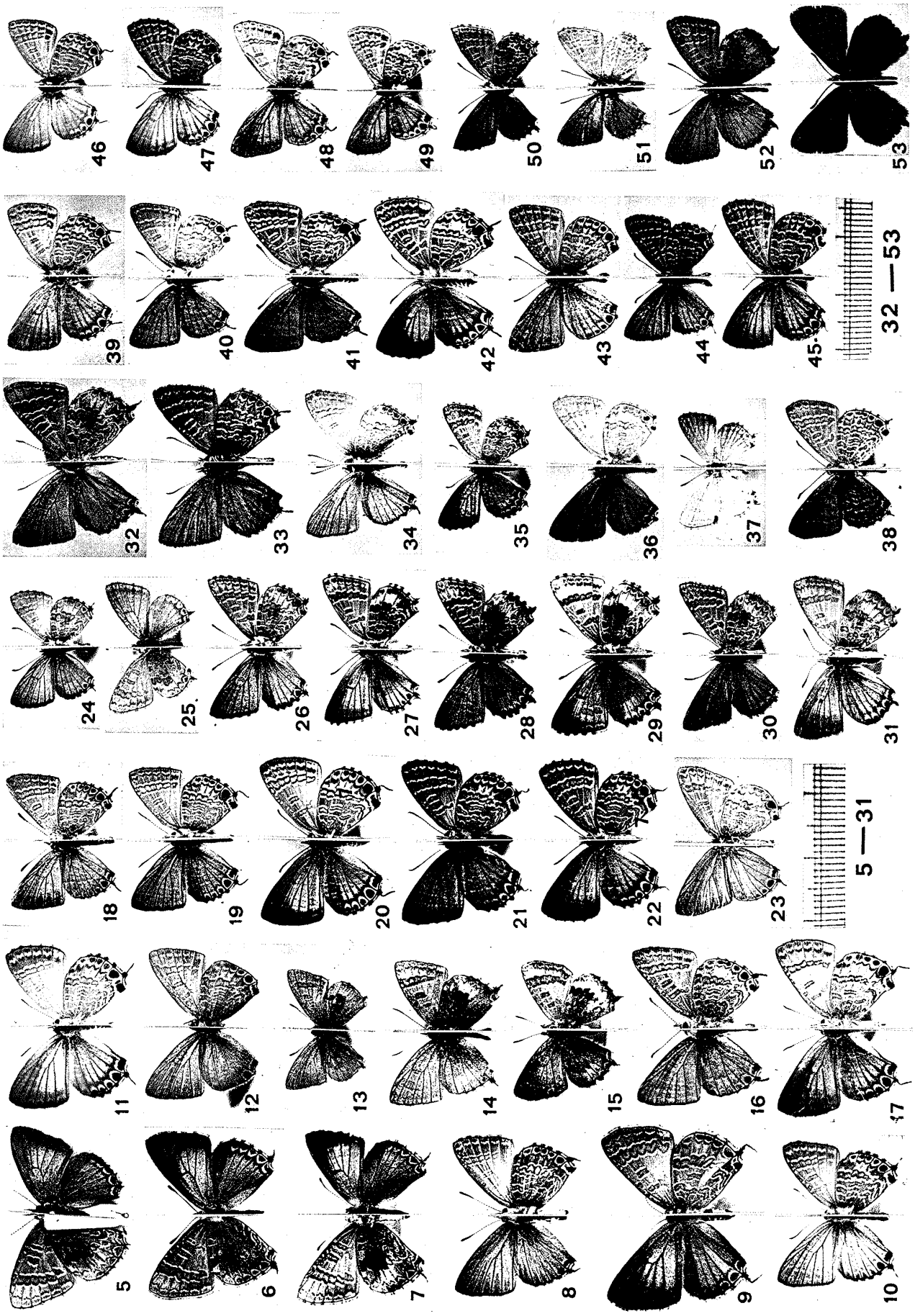
Waterhouse & Lyell (1914) confused species B and the lilac summer form of species A under the name "*T. miskini* Lucas", while they assigned a winter form ♀ of B with an aberrantly extended white postdiscal suffusion beneath, to "*T. onycha atrosuffusa* Waterhouse" which had first been described on winter form ♂♂ of A or true *T. miskini* (Luacs). The confusion was lifted only partially by Waterhouse (1932), and since then this partial confusion has persisted in the literature as well as in major collections. However, the majority of the summer form specimens of the two species have been correctly distinguished and associated to the two groups of food plants, but unwittingly under the wrong specific names.

The winter form (Fig. 5-7, 32) is less well known. Judging from the label data of the specimens in *GW*, we presume that Waterhouse did not have typical winter form specimens of this taxon when Waterhouse & Lyell (1914) published their work. It conforms to the general description of the *Theclinesthes* winter form (p. 3-4) but the coloration is quite variable, sometimes obscuring subspecific characteristics: in the ♂ above the ground colour is shiny bluish lilac and sometimes conspicuously bluish; the terminal spots are reduced and beneath the white linings are more clearly marked; in the ♀ above the bluish marking is either light blue or purplish, extending apicad and distad, sometimes almost over the entire wing. The degree of darkening and postdiscal suffusion of the underside is often remarkably intense, but the suffusion seldom becomes pure white. One exception is the specimen from Moruya misidentified by Waterhouse & Lyell (1914) as ♀ of *atrosuffusa* (Waterhouse).

Androconia (Figs. 1-3, 114-118) — Typically (Figs. 1, 114) abundant, broader than long, straight and wide at base, slightly tapering towards apex, squat, reverse heart-shaped with about 15 ribs and nodules of moderate size. A notable exception (Fig. 116) with a curved base, a roundish shape and 22 ribs has been observed.

Distribution, habitat and life history — Commonly distributed along the southern coastal region of N. S. W. down to south of Narooma but rarer west of the Great Dividing Range, being known from only a few localities. Only limited numbers of specimens are known from the long northern coastal stretch of N. S. W. More males have been collected because of their hilltopping nature. For life history see Waterhouse (1932) and Common & Waterhouse (1972); food plants: several species of *Macrozamia*.

Comments — Some of the colleagues we have consulted were opposed to the designation of Kirby No. 4 as lectotype of *onycha*, suggesting that it would upset the "stability" of the currently employed nomenclature. We cannot use Kirby No. 1 or 2 as lectotype of *onycha* because there is ambiguity as to



their subspecific identity (see p. 21). Actually, because of the confused taxonomy, the stability and universality of nomenclature, which must be protected under these circumstances, have not really existed. We have thus preferred to follow the most straightforward and unambiguous course and to accept the temporary confusion that will ensue.

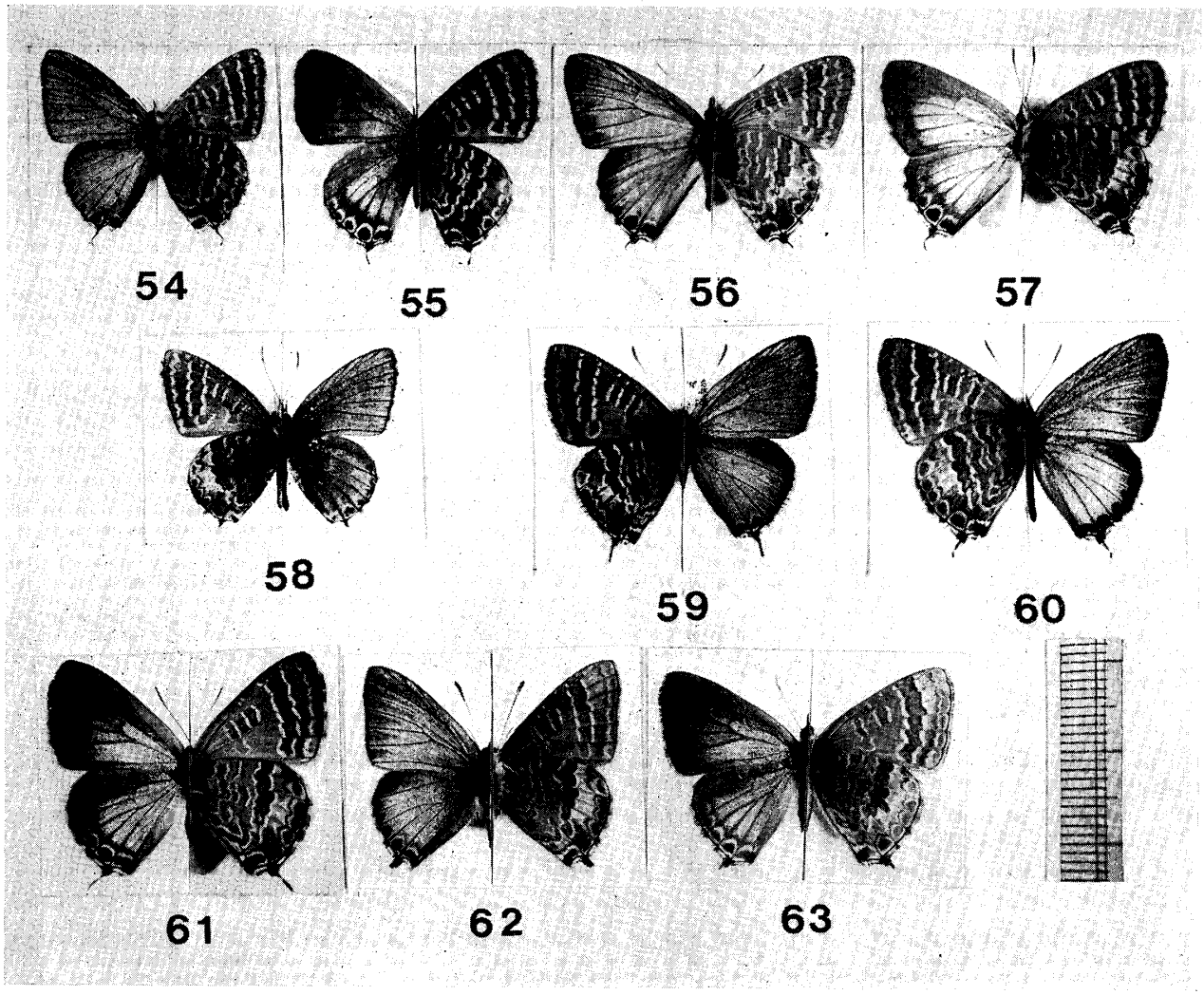
***T. onycha capricornia* subsp. n.** (Figs. 4, 10, 11, 33, 54-63, 119-124)

Lycaena onycha Hewitson; Herrich-Schaeffer, 1869: 72-73. (?)
Utica onycha Hewitson; Semper, 1878: 166 (part).
Utica onycha Hewitson; Druce, 1902: 116 (part); Waterhouse, 1903: 240-241 (part).
[*Theclinesthes onycha onycha* Hewitson; Waterhouse & Lyell, 1914: 109(part). Double misidentification.]
[*Theclinesthes miskini* Lucas; Waterhouse & Lyell, 1914: 110 (part). Misidentification.]
Nacaduba onycha onycha Hewitson; Fruhstorfer, 1916: 125 (part).
Nacaduba onycha [*onycha*] Hewitson; Seitz, 1923: 918 (part).
[*Theclinesthes miskini* (Lucas); Common, 1964: 114-115 (part), figs. 454-456; McCubbin, 1971: 90 (part). Misidentification.]
[*Theclinesthes miskini* Lucas; D'Abrera, 1971: 358 (part), figs. Misidentification.]
[*Theclinesthes miskini* (T. P. Lucas); Common & Waterhouse: 396-397 (part). Misidentification.]

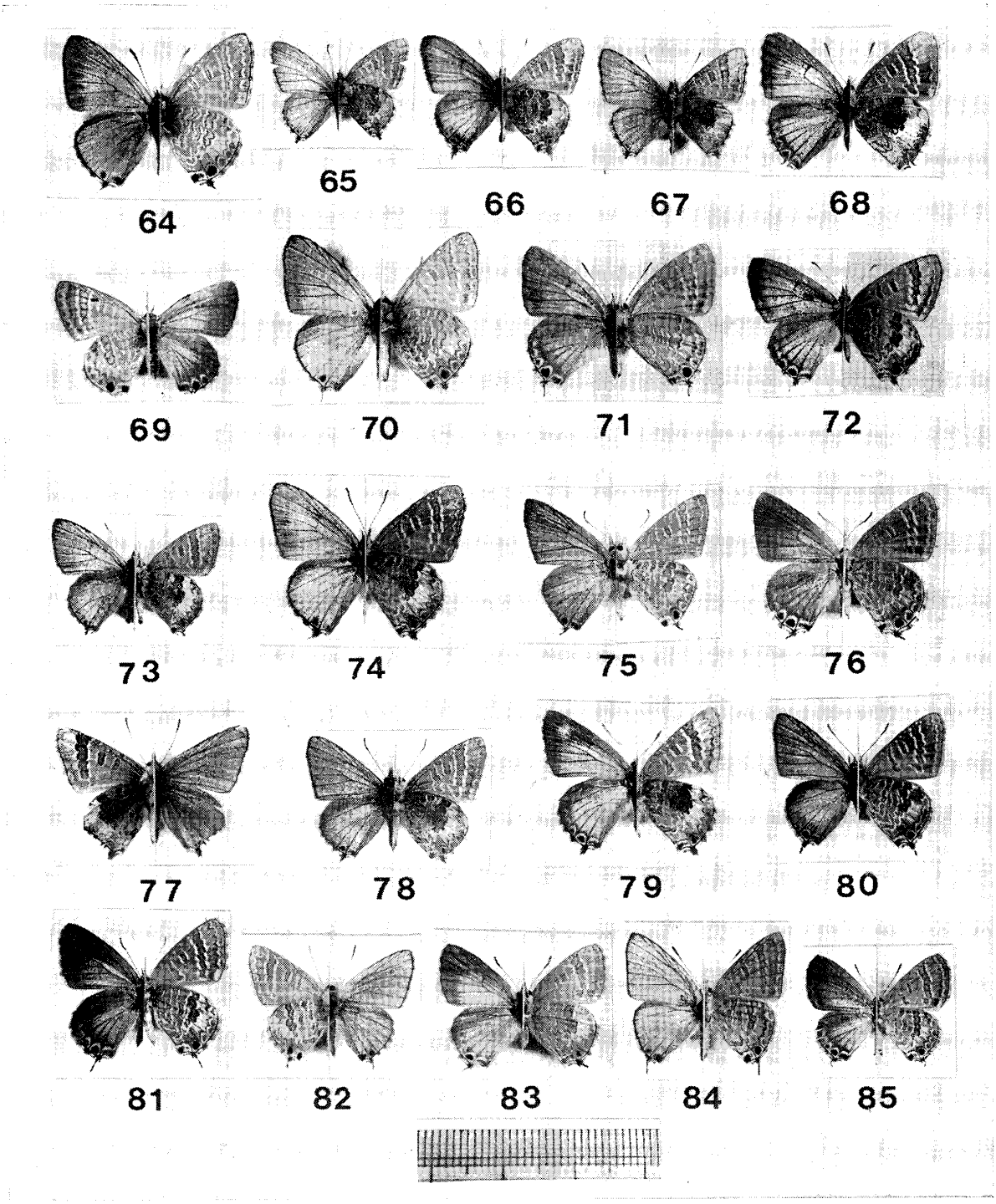
Types—Holotype ♂, AUSTRALIA: Queensland, labelled "Kuranda Jan 08 F. P. D[odd].", "B" and "G. A. Waterhouse Collection" in Australian Museum; *paratypes* 152♂ 101♀: "Cape York Damel" 1♀ (w) *Semper* BMNH; Cape York Peninsula - 20 Mile Creek via Bramwell 1♂ (w) 15. vii. 1975 EUQ - *Cycas media* grove 22 km N of Moreton 11♂ (w) 2♀ (w) 2. vii. 1975 EUQ and *AS* (3♂ (w) 1♀ (w)); Sandstone hilltop 12 km N of Hopevale 9♂ 1♂ (w) 15. vii. 1976 EUQ and *AS* (3♂); Coen 1♂ 10. i. 1964 *MM*; Cooktown - 1♀ viii. 1897 (P. de la Garde) BMNH, 1♂ (9. x.) 1♀ (19. x.) 1♀ (20. x.) 1♂ 1♀ (28. x.) 1♀ (30. x.) 1902 1♂ (3. x.) 1♂ 1♀ (26. xi.) 1904 *GW* AM, 1♂ 31. xii. 1963 *MM*, 1♂ 3. ix. 1972 *AA* - Finch Bay 1♀ (w) 24. vi. 1959 AM - Endeavour River 1♂ (w) 10. vii. 1976 EUQ; Cedar Bay 17♂

Figs. 5-53. —Upper and undersides of left (or right for those with asterisks) pair of wings of *Theclinesthes* species: (5-9) *T. onycha onycha* (Hewitson): (5) *Utica onycha* Hewitson *lectotype* ♀ w*; (6-9) near Batemans Bay: (6) ♀ w* em. 26. v. 1969; (7) ♀ w* 25. v. 1969; (8) ♂ em. 22. i. 1969; (9) ♀ em. 13. iii. 1969, space CuA_1-CuA_2 aberrantly pale. (10, 11) *T. onycha capricornia* n. *paratypes* near Rockhampton: (10) ♂ em. 31. xii. 1961; (11) ♀ em. 4. i. 1962. (12-15) *T. miskini miskini* (Lucas), form (2): (12) *Lycaena miskini* Lucas *lectotype* ♂; (13) *Utica onycha* var. *atrosuffusa* Waterhouse *lectotype* ♂ w; (14) ♂ w Como viii. 1912; (15) ♀ w Sydney viii. 1913. (16-18) *T. miskini eucalypti* n.: (16) *holotype* ♂; (17) *paratype* ♀ Kuranda—Mareeba; (18) *paratype* ♂ Iron Range 14. iv. 1964. (19, 20) *T. miskini arnoldi* (Fruhstorfer) near Port Moresby 1963: (19) ♂; (20) ♀. (21, 22) *T. miskini brandti* n. Admiralty Islands: (21) *holotype* ♂; (22) *paratype* ♀ Los Negros Is. 24. iv. 1952. (23) *T. miskini gaura* (Doherty): *Nacaduba gaura* Doherty *holotype* ♂. (24) *T. miskini miskini* (Lucas) form (5) ♂ (w) near Dampier, W. A., larva on *Sesbania*. (25-30) *T. albocincta* (Waterhouse): (25) form (1), *Utica onycha* var. *albocincta* Waterhouse *lectotype* ♂ w*; (26-29) form (3): (26) ♂ Pt Gawler em. 2. ii. 1972; (27) ♀ Pt Gawler em. 23. i. 1972; (28) ♂ w Warooka pup. 15. v., em. 2. vi. 1973; (29) ♀ w Warooka pup. 15. v. 1972; (30) form (2) ♂ near Dongara, W. A. (31) *T. hesperia hesperia* n. *paratype* ♀ Bunbury 7. x. 1961. (32) *T. onycha onycha* (Hewitson) ♂ w near Lismore. (33) *T. onycha capricornia* n. *paratype* ♂ Springsure x. 1974. (34-40) *T. miskini miskini* (Lucas): (34) form (2) ♂ Brisbane 11. xii. 1908; (35) form (2) ♀ Brisbane 10. iii. 1959; (36) form (5) ♂ Bowen, Qld. v. 1967, larva on legume; (37) form (5) ♀* Yuendumu—Alice Springs, N. T.; (38-40) form (6): (38) ♂ near Mt Cahill xi. 1972; (39) ♀ near Darwin 22. xi. 1970; (40) ♂ Cape Wessel. (41, 42) *T. miskini eucalypti* n. Weipa, larva on *Eucalyptus*: (41) ♂ (w); (42) ♀ (w). (43-45) *T. miskini arnoldi* (Fruhstorfer): (43) *Nacaduba onycha arnoldi* Fruhstorfer *neotype* ♂; (44, 45) New Hanover: (44) ♂; (45) ♀. (46, 47) *T. miskini feminalba* n. Jayapura: (46) *holotype* ♂; (47) *paratype* ♀. (48, 49) *T. miskini gaura* (Doherty): (48) *Plebeius* (*Theclinesthes*) *eremicola* Röber *neotype* ♂; (49) ♀ Pura. (50, 51) *T. albocincta* (Waterhouse): (50) form (2) ♂ Wyperfeld National Park, Vic.; (51) form (4) ♂ near Dampier, W. A.. (52) *T. hesperia hesperia* n. *holotype* ♂. (53) *T. hesperia littoralis* n. *paratype* ♂ spring brood 14. x. 1967.

16♀ (Meek) *R* BMNH; Meringa 2♂ 1♀ bred 11., 14. i. 1926 AM; Kuranda 5♂ 6♀ 1♀ (w) (Dodd) *BB*, 4♀ (1906) 1♀ (1907) 6♂ 3♀ (xii. 1909) 1♂ (1912) (Dodd) *CO*, 2♂ 3♀ (Dodd) *R*, BMNH (1♂ 1♀ each of this series to be deposited in CM, OM, USNM and ZMB) - 1♂ i. 1908 (Dodd), 1♀ iii., 1♀ 24. iv. (R. E. Turner), 1902, 2♀ ii. 1908 (Dodd), *GW* AM - 1♂ 1♀ i. 1908 ANIC, 1♂ (-) 1♀ ii. 1908 SAM; Kuranda Range - Smithfield pupae on *Macrozamia lucida* emerg. 1♂ (14.) 4♂ (16.) 3♀ (19.) x. 1974 *NQ* (1♂ 1♀ to be deposited in NMV); Atherton 1♀ 23. iii. 1906, Stannary Hills 1♂ (w) 12. vii. 1903, *GW* AM; Cairns 1♀ i. 1943 SAM, 1♂ (23. iv. 1960) 1♂ (1. v. 1961) *JK*; Herbert River - Macnade near Ingham 3♂ 2♂ (w) vii. 1911, 1♂ v. 1913, AM; no further locality 1♂ labelled "*Lycaena miskini* Lucas" 26. xii. 1890 *R* BMNH; Mackay 2♂ 24., 29. xii. 1891 1♀ (w) 6. v. 1892 *R*, 2♂ 1♀ (-) 1♂ 24. iv. 1895, 2♂ 2♀ xii. 1900 1♂ 1♀ bredi. 1901 *BB*, BMNH - 1♂ (iii.) 1♀ (ix.) 1899, 1♂ 1♀ (ii.) 8♂ 6♀ (xii.) 1900, 3♂ 9♀ (i.) 1♂ 2♀ (ii.) 1♂ 1♀ (iii.) 1901, (R. E. Turner) *GW* AM - 1♂ SAM; Carnarvon Range 1♂ 10. xii. 1938 AM, 1♂ 3. i. 1941 ANIC; Springsure 2♂ (w) 26. -29. iv. 1971 *MM*, 1♂ 3♂ (w) 20. x. 1974 *LS* (1♂ 1♂ (w)) and *AS*; Expedition Range - Rainbow Falls 1♂ 2♀ 16. xii. 1973 *AA*; Mt Morgan 1♂ (w) 3. vi. 1975 *AA*; Rockhampton - 1♀ emerg. in Sydney 26. ii. 1908 *GW* AM, 1♂ 14. - 28. i. 1973 EUQ - The Caves 2♀ 21. xii. 1961, larvae feeding openly on young leaves of *Cycas* emerg. 1♂ 31. xii. 1961, 1♀ 4. i. 1962, ANIC - Mt Archer 1♀ 22. iv. 1971 *MM*, 1♂ 1♀ 8. xii. 1973 *AA*; Yeppoon 2♀ 23. xii. 1961 - 5. i. 1962 ANIC, 1♀ 6. i. 1934 EUQ; Razor Back Range 1♂ 1♀ ii. 1964, Bribie Look-out 1♂ ii. 1964 *RG*; Palmwoods on *Macrozamia* 3♂ pup. 15. iv. emerg. 1. v. 1923 *GW*, Landsborough



Figs. 54-63. *T. onycha capricornia* n. *paratypes* unless stated otherwise; details as in Figs. 5-53: (54, 55) Cape York Peninsula 2. vii. 1975: (54) ♂; (55) ♀; (56) *holotype* ♂; (57) ♀ Kuranda vi. 1902; (58) ♂ (w)* Atherton; (59) ♂* Expedition Range; (60, 61) Brisbane: (60) ♂* 10. x. 1961; (61) ♀ 2. iii. 1959; (62) ♂ w Palmwoods; (63) ♀ w Mt Nebo near Brisbane.



Figs. 64-85. *T. miskini miskini* (Lucas); details as in Figs. 5-53: (64-66) form (1): (64) ♂ Expedition Range; (65, 66) ♂ (w) Springsure 29. iv. 1971; (67-74) form (2): (67, 68) Millmerran: (67) ♂ w 20. iv. 1940; (68) ♀ w 7. vi. 1930; (69) ♀* Stradbrooke Island; (70) ♂ Lithgow; (71) ♀ Barrington Tops; (72) ♀ (w) locality unknown (*MR*), probably Port Stephens; (73) ♂ w Port Stephens; (74) ♂ (w) Canberra; (75, 76) form (3) Flinders Range: (75) ♂; (76) ♀; (77-81) form (4): (77) ♂ w* Mt Singleton; (78) ♂ w Geraldton; (79) ♀ w Mandulah, subapical patch artefact; (80) ♂ Drummond Cove near Geraldton; (81) ♀ Moresby Range, larva on *Acacia*; (82, 83) form (5): (82) ♂* near Onslow, W. A., ANIC; (83) ♀ Millstream, W. A., larva on *Sesbania*; (84, 85) form (6): (84) ♂ East Alligator River; (85) ♀ near Mt Cahill 16. xi. 1972.

1♂ w "12/4" vii. 1919, Esk 2♂ ii. 1896 *GW*, AM; Mt Nebo 1♀ w 27. v. 1923 ANIC; Taylor Range 1♂ 2♀ (Dodd) *HD-JJ* BMNH; Brisbane 1♂ 1♀ *GW* AM - 1♀ 14. iii. 1914, 1♂ 5. iii. 1960, 3♂ (14. x.) 5♂ (19. xi.) 3♂ (3. xii.) 1♂ (10. xii.) 1961, 4♂ *27. iii. 1966, ANIC - 1♀ 2. iii. 1959 JK.

Other material examined — Queensland — No Further data 2♀ *BB* BMNH; "Bridoola" [partly illegible] 1♂ (26.) 1♀ (27.) xi. 1908 *GW* AM; Brisbane 1♀ w "ii. 1910" SAM. Northern Territory — "Darwin" 1♂ (F. P. D[odd]) SAM.

Holotype (Fig. 56) — ♂ summer form, 15 mm; above like *onycha* (*s. str.*) but ground colour dull greyish lilac with larger caudal spots on hindwing; hindwing less hairy; beneath light brown, bands not significantly darker than ground colour, dark linings weak or absent while white linings very conspicuous; post-discal suffusion on hindwing whitish but not extensive; caudal spots large, strongly marked.

Paratypes—♂, 13-16 mm, ♀, 12-16 mm. Summer forms colour beneath variable, in some specimens from Brisbane and Expedition Range (Figs. 59-61) bands are darker than ground colour; some specimens from Brisbane area may be approaching those of *onycha* (*s. str.*); ♂ cilia sometimes chequered on both wings; 1♂ from Springsure (Fig. 33) somewhat bluish above, beneath grey with well marked white linings and no postdiscal suffusion; ♀ blue areas variable in expanse and coloration but never obscure; ground colour beneath sometimes very pale brown; otherwise as in ♂. Winter forms between Atherton area and Brisbane (Figs. 58, 62, 63) quite variable; ♂ sometimes bluish above; both sexes beneath often darker, with darker postmedian band especially on hindwing, postdiscal suffusion sometimes conspicuously whitish, caudal spots reduced and tail sometimes shorter than in summer forms.

Possible winter forms form Cape York Peninsula ♂ (Fig. 54) above dark lilac, with smaller terminal spots on hindwing above than in average summer forms form elsewhere; beneath ground colour and bands uniformly brownish grey with prominent white linings; caudal spots moderately well marked; postdiscal suffusion weak; tail long and filamentous; cilia predominantly white distally on forewing; ♀ (Fig. 55) similar to other ♀♀ but with purer blue markings above.

Androconia (Figs. 119-124) — Sometimes rather similar to those of *onycha* (*s. str.*), but more frequently like those of *miskini* (*s. str.*) than of *onycha* (*s. str.*), being longer than broad, with round base, not broader at the base and with 11-12 ribs.

The subspecies is distinguished from *onycha* (*s. str.*) by the paler, more uniform, brownish ground colour, weakly marked dark linings and strongly marked white linings beneath, and more heavily marked caudal spots.

T. "onycha onycha" of Waterhouse and Lyell (1914) apparently contained some *capricornia*, especially ♀♀, from Kuranda (see footnote on p. 19).

The name of the subspecies, *capricornia*, refers to the Tropic of Capricorn which passes through its range of distribution.

Distribution, habitat and food plants — The subspecies is distributed in Queensland from Brisbane to Cape York, mainly coastal, but is also known from some inland areas (but still east of the Great Dividing Range) such as Expedition Range, Springsure, and Carnarvon Range of central Queensland. But it appearently does not occur around Toowoomba, south Queensland, which is nearer to the coast than the localities above, but west of the Divide. Moulds' (1973) report of "*T. miskini*" [*T. onycha*] from Springsure was based on a mixture of *T. onycha capricornia* and *T. miskini* (*s. str.*), both mainly of winter forms. The only known specimen from Darwin is quite similar to those from northern Queensland, but the record needs further confirmation. The specimen from Katherine, N. T., in SAM mentioned by Common & Waterhouse (1972) of this species (=B) turned out to be *T. miskini* (=A). No *T. onycha* specimens have ever been obtained from Torres Strait Islands or Papua New Guinea.

Butterflies are commonly caught flying near the larval food plants which include both *Cycas* and *Macrozamia* species (Common and Waterhouse, 1972). ♂♂ are fond of hilltopping.

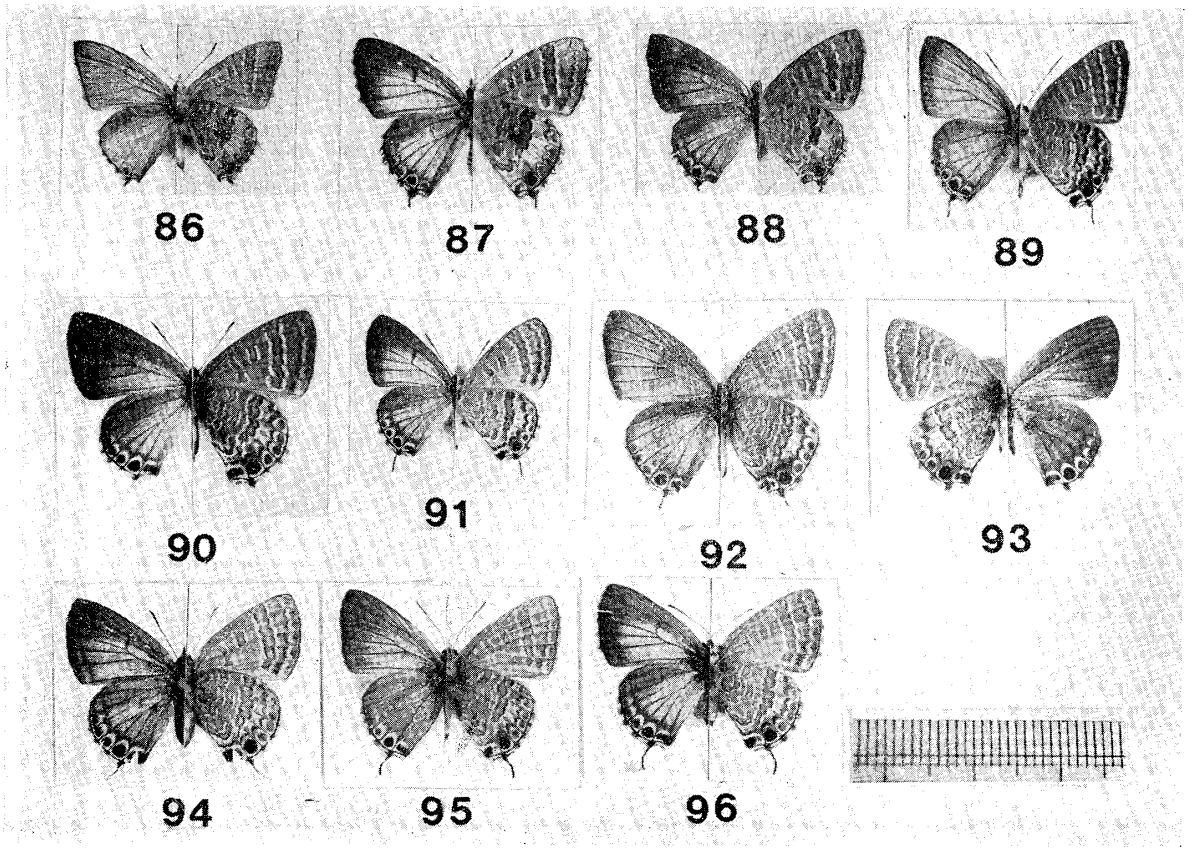
Comments — The barrier between *onycha* (*s. str.*) and *capricornia* seems to be between Caloundra, Queensland, and the Lismore area, N. S. W. The Brisbane specimens may represent some transition, but we have included them in *capricornia* because of their stronger affinity to this subspecies. From Rockhmapton to Coen, we have not been able to establish any clinal variation, but specimens from

inland may be different. It is essential to secure a good series of summer and winter form from each locality to compare any infrasubspecific geographic variation, especially for such localities as Springsure or Cape York Peninsula. Winter form specimens are scarcer than the summer forms in collections, but this may be due to the uneven collecting throughout the year. Although *Macrozamia* grows in the coastal area of south-western Australia, *T. onycha* is not known from there nor replaced by any similar species feeding on it.

Theclinesthes miskini (T. P. Lucas) (nec authors)

T. miskini miskini (T. P. Lucas) (nec authors) (Figs. 12-15, 24, 34-40, 64-85, 125-143)

?〔*Lycaena onycha* Hewitson; Herrich-Schaeffer, 1869: 72-73. Misidentification.〕
〔*Utica onycha* Hewitson; Semper, 1878: 166 (part). Misdientification.〕



Figs. 86-96. *T. miskini* (Lucas) subspecies; details as in Figs. 5-53:
Figs. 86-88. *T. miskini eucalypti* n. *paratypes*: (86, 87) Tinaroo, larva on *Eucalyptus*: (86) ♂w; (87) ♀w; (88) ♀(w) near Moreton, Cape York Peninsula.
Figs. 89-94. *T. miskini arnoldi* (Fruhstorfer): (89, 90) Rouku: (89) ♂; (90) ♀; (91) ♀ Normanby Island; (92, 93) Aru Islands: (92) ♂; (93) ♀*; (94) ♀ New Britain 1894.
Figs. 95, 96. *T. miskini feminalba* n. *paratypes* Manam Island: (95) ♂; (96) ♀.

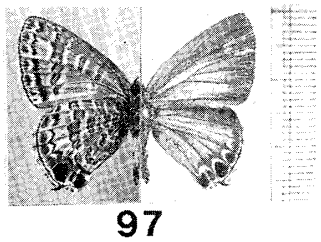
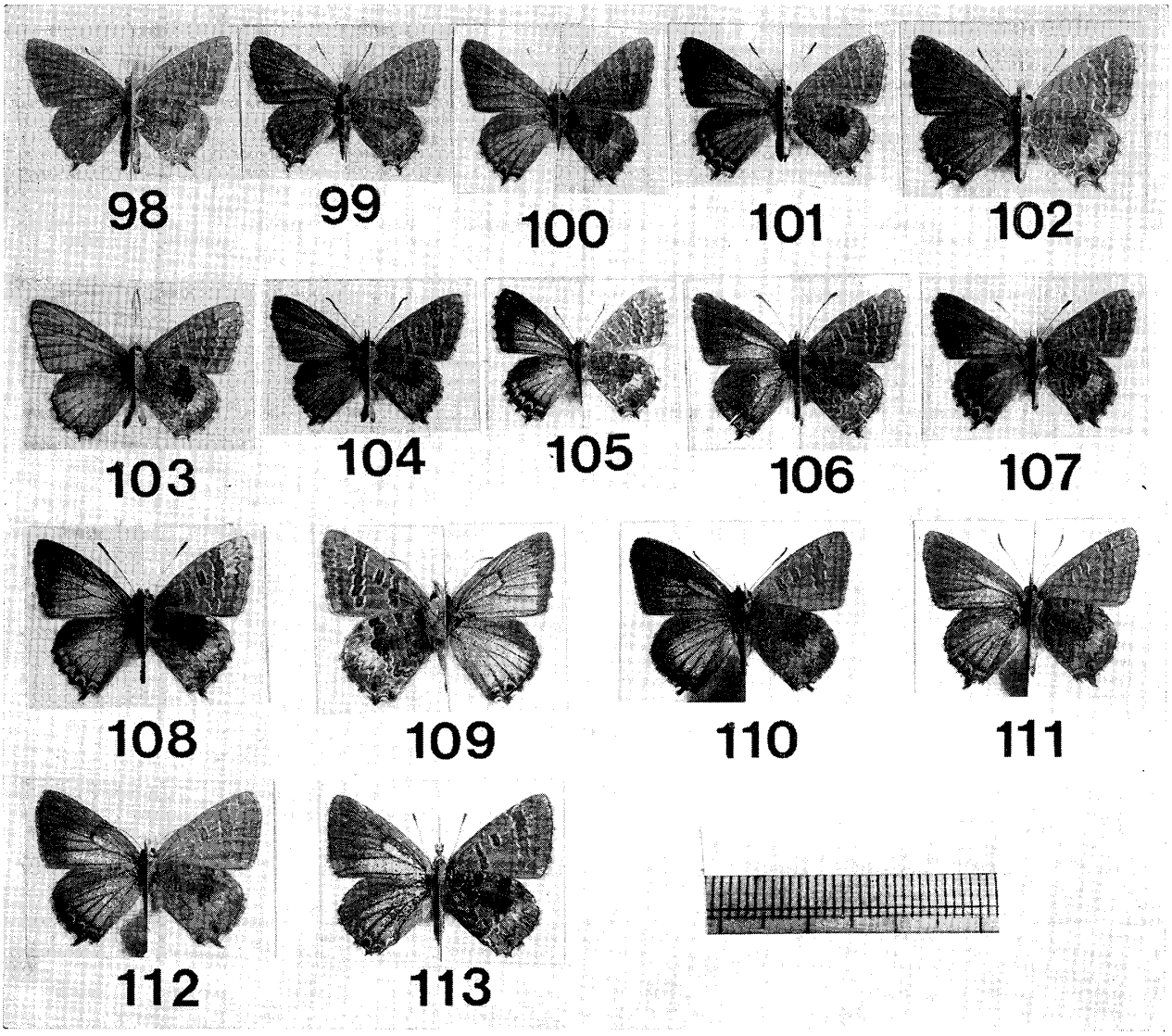


Fig. 97. *T. miskini gaura* (Doherty) ♀ Sumba; right pair of wings.



Figs. 98-113. *Theclinesthes* species; details as in Figs. 5-53:

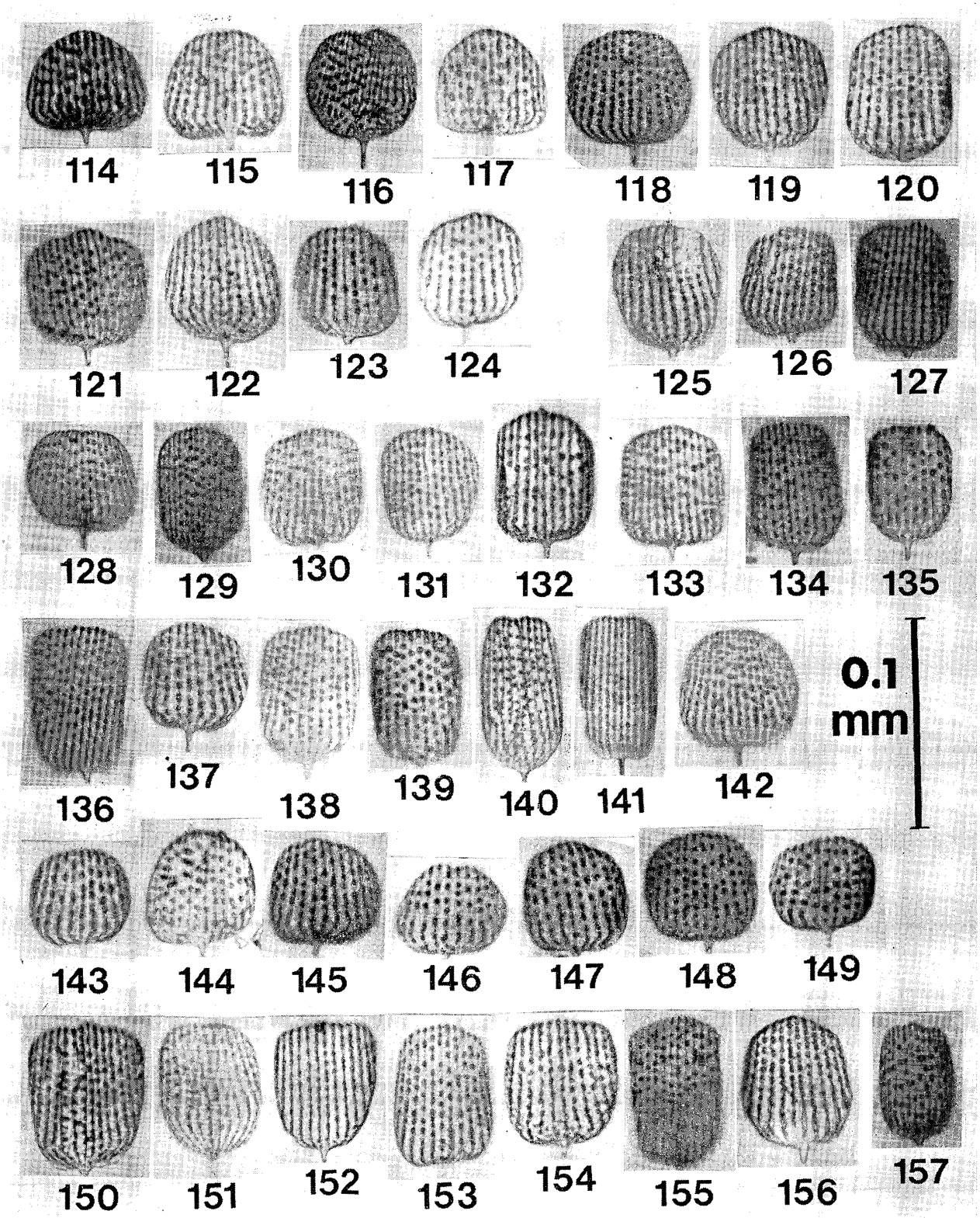
Figs. 98-109. *T. albocincta* (Waterhouse): (98-102) form (2): (98) ♂ (w) Simpson Desert, S. A.; (99-101) Sunset Country, Vic.: (99) ♀ 21. xii. 1975; (100) ♂ em.; (101) ♀ em.; (102) ♀ Wyperfeld National Park, Vic.; (103-109) form (3): (103) ♂ Robe, light greyish blue, submarginal area narrowly whitish; (104) ♂ Port Gawler em. 21. i. 1972; (105) ♀ Stenhouse Bay, resembling *T. serpentata* (Herrich-Schaeffer); (106, 107) Port Gawler; (106) ♂ 15. iv. 1969; (107) ♀ em. 20. i. 1972; (108) ♂ w em. 27. v. 1973; (109) ♂ (w) Edithburgh.

Figs. 110-113. *T. hesperia littoralis* n. *paratypes* unless stated otherwise: (110-112) summer brood 27. xii. 1975: (110) *holotype* ♂; (111) ♂; (112) ♀; (113) spring brood ♀ (w) 14. x. 1967.

〔*Lycaena onycha* Hewitson; Kirby, 1879: 174 (part). Misidentification.〕
Lycaena miskini T. P. Lucas, 1889: 158, figs. 5-7. LECTOTYPE ♂, here designated, AUSTRALIA: Queensland (SAM) 〔examined〕.
〔*Utica onycha* Hewitson; Druce, 1902: 116 (part); Waterhouse, 1903: 240-241, pl. 3, figs. 14, 39 (part). Misidentification.〕
Utica onycha var. *atrosuffusa* Waterhouse, 1903: 241-242. LECTOTYPE ♂, here designated, AUSTRALIA: N. S. W. (AM) 〔examined〕. **Syn. n.**
Theclinesthes onycha atrosuffusa Waterhouse; Waterhouse & Lyell, 1914: 110, figs. 273, 327 ♂w (nec ♀w).
Theclinesthes miskini Lucas; Waterhouse & Lyell, 1914: 110 (part).
〔*Nacaduba onycha onycha* Hewitson; Fruhstorfer, 1916: 124-125, pl. 5, fig. 3 (part). Misidentifcation.〕
Nacaduba onycha onycha Hewitson 〔ab.〕 *atrosuffusa* Waterhouse; Fruhstorfer, 1916: 125.
〔*Nacaduba onycha* 〔*onycha*〕 Hewitson; Seitz, 1923: 918 (part). Misidentification.〕
Nacaduba onycha 〔*onycha*〕 Hewitson ab. *atrosuffusa* Waterhouse; Seitz, 1923: 918.
〔*Theclinesthes onycha onycha* Hewitson; Waterhouse, 1932: 175 (part). Misidentification.〕
Theclinesthes onycha atrosuffusa Waterhouse; Waterhouse, 1932: 175 ♂w (nec ♀w).
Theclinesthes onycha onycha (Hewitson); Common, 1964: 114 (part); McCubbin, 1971: 90, 93, fig. 17 (part). Misidentification.〕
Theclinesthes onycha atrosuffusa Waterhouse; Common, 1964: 114 (part).
〔*Theclinesthes onycha onycha* Hewitson; D'Abrera, 1971: 359 (part). Misidentification.〕
Theclinesthes onycha atrosuffusa Waterhouse; D'Abrera, 1971: 359 (part).
〔*Theclinesthes onycha onycha* (Hewitson); Common & Waterhouse, 1972: 397-398 (part). Misidentification.〕
Theclinesthes miskini (T. P. Lucas) 〔f. hib.〕 *atrosuffusa* Waterhouse: Common & Waterhouse, 1972: 396. Wrong combination to a misidentified species.

Types—*Lycaena miskini* T. P. Lucas, *lectotype* ♂, AUSTRALIA: Queensland, labelled "*Miskini* Type" and "Brisbane Lucas Coll.", abdomen lost, in South Australian Museum (Fig. 12); *Utica onycha* var. *atrosuffusa* Waterhouse, *lectotype* ♂w, labelled "*Theclinesthes onycha* var. *atrosuffusa* Type Male Waterhouse", "Fig. 327 Upperside IN The Butterflies of Australia, by WATERHOUSE & LYELL, was taken from this specimen", "G. A. Waterhouse Collection", "Como 8:9:00", "K69189" and "41021", abdomen lost, in Australian Museum (Fig. 13).

Other material examined—No locality, ex musaeo Boisduval 1♂ labelled "Diliha Boisd. N. Holland" BMNH. AUSTRALIA: Queensland — 1♂ *JJ* BMNH; 4 km E of Camooweal 1♀ 12. v. 1973, E. Buckley River 77 km NW of Mt Isa 9♀ 12. v. 1973, ANIC; no further locality 1♂ *JJ* BMNH; Charters Towers 2♂ (w) 18. vii. 1975 *LS*; Burra Range 2♂ (w) 30. ix. 1974 *AA*; Ayr 1♀ 15. iii. 1976 ovipositing on a leguminous plant *NQ*; no further locality 1♀, Port Denison 〔Bowen〕 1♀, *Hewitson* BMNH; Bowen 2♂ 2♀ emerg. 13.-27. v. 1967 *JK*, 1♂ (w) 4. x. 1974 *AA*; Cape River - Clermont-Charters Towers Road 1♂ 29. ix. 1974 *AA*; Clermont 1♂w 1♀w 27. vii. 1919, 1♀ 1. x. 1920 *GW* AM; 8 km N of Peak Downs 1♂w 14. vii. 1974 *AA*; Mackay 1♂, 1♀ (labelled "*L. miskini* ♀"), *R* BMNH - 1♀ iii. 1901 (R. E. Turner) 1♂ (w) v. 1935 *GW* AM; Nebo 1♂ 1. iv. 1972 *AA*; Rockhampton - 1♂ 23. vii. 1919 AM - Mt Archer 1♂ 22. iv. 1971 *MM*; Stanwell 1♂ 3. xii. 1973, 24 km W of Moura 1♂ 9. xii. 1971, Grantleigh 16 km SW of Westwood 2♂ 1♀ 12. i. 1973, Wowan-Westwood 1♂ w 2. vi. 1974, *AA*; Wowan 2♂ 1♀ 7. iii. 1974 *NQ*; Duaringa - Coomooboolaroo 1♂ (Meek), Dawson district 1♂ 2♀ *R*, BMNH; Springsure 1♂ (w) 2. x. 1974 *LS*, 2♂w (26., 29. iv.) 4♂ (w) (31. viii. - 2. ix.) 1971 *MM*; Expedition Range - 5♂ 10. ii. 1973 *AS* - Blackdown Tableland 2♂w (28. vii., 29. viii.) 2♂ (10. xi., 16. xii.) 1973 *AA*; Isla Gorge 1♂ 6. xi. 1972 *AA*; Eidsvold 2♂ 1♂ (w) 1♀ ANIC, 2♂ 3♀ 27. i. (or i., ii.) 1914 *GW* AM; Gayndah 1♂ ex museo Godeffroy *CO*, 1♂ (Semper) *HD-JJ*, BMNH; Mitchell 1♀ (23. iii.) 1♀w (on *Acacia salicina*, pup. 14. vi., emerg. 7. viii.) 1933 AM; Dalby 1♀ ANIC; Toowoomba 1♀ *R* BMNH, 1♂ 17. ii. 1963 ANIC; Millmerran 1♂ 2♀ (w) (5. iii., 15. iv.) 1♀w (12. vi). 1927, 1♂ (w) (7. vi.) 3♂w 4♀ (7., 20. vi.) 1♂ 1♀ (24., 31. x.) 1♂ (pup. 20. xii., emerg. 31. xii.) 1930, 1♂ 6. x. 1938, 2♂ -/(w) 2♀ -/(w) 29. iii. - 1. iv. 1939, 1♀*29. xii. 1957, 2♂ 5. i. 1958, 1♂ (10. i.) 2♀ (23., 24. ii.) 1960, *GW* (part) AM and ANIC; Toowong 1♂ (Dodd) BMNH; Beerburrum 1♂ xii. ANIC; Brisbane - 1♀ (T. P.



Lucas) 2♂ (w) (x. 1903, 28. iii. 1908) 1♂ (w) (-) 1♂ (w) (21. v. 1904) 1♂w (v. 1910) *GW* AM, 1♂ (5. ii.) 1♂ (w) (12. iv.) 1903 1♀*13. iv. 1952 ANIC, 1♂w vi. 1903 1♂ (w) vi. 1914 1♀ i. 1912 SAM, 1♀ 10. iii. 1959 *JK* - Grove Estate 4♂ 11.-16. xii. 1908 *GW* AM; Stradbrooke Island 1♀ 13. i. 1903 ANIC; Glen Aplin 11♂ 3♂ (w) 1♀ (3.-29. iii.) 1♂w (20. iii.) 1948 *MR* ANIC; Killarney 1♀ 2. i. 1923 EUQ; Stanthorpe 1♀ 1. ii. 1941, 2♂ 1♀ 18. iii.-14. iv. 1943, 1♀w 17. iv. 1944, ANIC. N. S. W.—Bourke - Mt Oxley 4♂w 5. vii. 1977; 24 km W of Grafton 1♂ 27. i. 1976 *JA*; Gunnedah 9♂ (18. xii. 1942, 7.-27. ii., 7.-20. iii. 1943) AM, 1♂*2♀*(iv. 1966) ANIC, 5♂ (27., 28. iii. 1970, 31. iii. 1972) *AS*; Barrington Tops - Tubrabucca Creek 1200 m 1♀ 9. i. 1950 ANIC; Lithgow 1♂ 10. ii. 1968, Blackheath 1♂ 30. xi. 1969, *AS*; Port Stephens 2♂w (1., 6. ix. 1922) *MR*, 1♂ (w)*(11. iii. 1970) 1♀*(19. ii. 1970), no locality 1♀ (w) *MR*, Narara 2♂ 22. ii. 1925 *MR*, ANIC; Toronto 1♂w AM; Peats Ridge 1♂ 3. ii. 1973 *RG*; Sydney 1♂ 21. ii. 1903 (Waterhouse) *HD* BMNH, 1♂ (17. xii.) 1♂ (8. iv.) 1911 1♂ (30. iii. 1912) 1♀w (viii. 1913) *GW* AM; Como 3♂w (20. viii., 14., 21. ix.) 1901, 1♂ (13. ii.) 2♂w (14. ix.) 1904, 2♂w (15., 16. ix.) 1905, 2♂w (20., 29. viii.) 1♂ (29. x.) 1908, 1♂ (w) 1♂ 1♀ (w) 15. x. 1910, 2♂ 7. i. 1911, 2♂w (viii.) 3♂w (17. viii.) 8♂ 1♀ (31. x.) 1912, 1♂ (1. ii.) 3♂ (w)/w (16. viii.) 1913, 1♂ 6. xi. 1914, 2♂ 20. xii. 1919, *GW* AM; Stanwell Park 1♂*13. i. 1970, 25 km NNW of Barellan 1♂ 2♀ 27. i. 1974, Narrandera Range 2♂ 7. iv. 1968, ANIC; Gunbar 1♂ 9. i. 1972 *RG*. Australian Capital Territory — 0.5 km N of Mt Ainslie 1♂ 8. iii. 1973, Black Mountain 2♂ 21. i. 1956, ANIC; Mt Ainslie 17♂ 2♂ (w) 27. iii. 1973 *RG*. Victoria — Trentham Cliffs 1♂ 16. i. 1971 *RG*; Big Desert 38 km N of Yanac 1♀w 16. ix. 1973 *DC*. South Australia — Simpson Desert 26.36' S 2♂ 5♂w 26.-30. vii. 1973 NMV; Broken Hill 1♂ 2. iv. 1972 *AS*; Balhannah 1♂ (w) 24. v. 1893 SAM; Curramulka 1♂ (iii. 1964) 1♀ (ii. 1963) Hallett Cove 1♂ 3. ix. 1971, *RG*; Melrose 300 km N of Adelaide 1♀ on *Acacia victoriae* emerg. 27. ii. 1976 *AS*; 32 km E of Iron Knob 1♂ 14. x. 1973 *RF*; Flinders Range - Arkaroola 1♂ 1♀ 20. ii. 1974 *RF*; Yunta 2♂ 2♀ (bred 23. xii. 1942, 1. i. 1943) AM, 4♂ i. 1963 *FP* ANIC; 45 km W of Yunta 1♂ 29. xii. 1968 *JA*; 10 km W of Iron Knob 1♀ 16. iii. 1968, 25 km NE of Etadunna High School 1♀ 17. ix. 1972, Swan Reach 1♂ (w) 9. iii. 1962 *FP*, ANIC; Mt Robinson 2♂w 11. ix. 1943 BMNH. Western

Figs. 114-157. Androconia; scales were mounted in air and photographs were taken with an Asahi Pentax Spotmatic camera using an Asahi Pentax microscopic adaptor and Olympus HI 100 objective without using immersion oil, and enlarged twice the size for printing. They were then reduced to half the size for the final reproduction. In Figs. 1-4, an Olympus 40 objective was used.

Figs. 114-118. *T. onycha onycha* (Hewitson): (114) Newport *AS* no slide number; (115) w Batemans Bay ANIC slide no. S 1061; (116) w Wamberal *AS* S1055; (117) w Lismore area *GM* S1120, cf. Fig. 32; (118) Coonabarabran *MM* S1124.

Figs. 119-124. *T. onycha capricornia* n. *paratypes*: (119) Brisbane ANIC S1125, cf. Fig. 60; (120) Rockhampton *MM* S1058; (121) Springsure *LS* S1121; (122) w Springsure *LS* S1123; (123) Kuranda AM S1128; (124) Coen *MM* S1057.

Figs. 125-143. *T. miskini miskini* (Hewitson): (125) Bowen, Qld, *AA* S1113; (126) (w) Mackay, Qld, AM S1130; (127) Expedition Range, Qld, *AS* S1042; (128) w Peak Downs, Qld, *AA* S1133; (129) w Springsure, Qld, *MM* S1122, cf. Fig. 66; (130) Brisbane, Qld, AM S1134; (131) w Millmerran, Qld, AM S1069; (132) Gunnedah, N. S. W., *AS* S1029; (133) w Como, N. S. W., AM S1067, cf. Fig. 14; (134) Yunta, S. A., *JA* S1021; (135) Yunta, S. A., *AS* S1025; (136) Koodaideri, W. A., KU S1028; (137) Mt Brockman, W. A., KU S1026; (138) Onslow, W. A., ANIC S1100, cf. Fig. 82; (139) near Geraldton, W. A., S1136, cf. Fig. 80; (140) Yuendumu, N. T., ANIC S1137; (141) (w) near Dampier, W. A., ANIC S1114, cf. Fig. 24; (142) NE of Mt Cahill, N. T., ANIC S1118, cf. Fig. 38; (143) NW of Cahills Crossing, N. T., ANIC S1080, cf. Fig. 84.

Figs. 144-149. *T. miskini eucalypti* n. *paratypes*, blue forms unless otherwise specified: (144) Claudie River *JA* S1035; (145) (w) Weipa *JA* S1116, cf. Fig. 41; (146) Paluma ANIC S1073; (147) lilac form worn, Mt Garnet ANIC S1077; (148) w Tinaroo ANIC S1088; (149) Townsville *MM* S1129.

Figs. 150-152. *T. miskini arnoldi* (Fruhstorfer): (150) Subitana ANIC S1074; (151) *neotype* S1106, cf. Fig. 43; (152) New Hanover BMNH S1107, cf. Fig. 44.

Fig. 153. *T. miskini brandti* n. *holotype* S1075.

Figs. 154, 155. *T. miskini feminalba* n.: (154) *paratype* Manam Island BMNH S1108, cf. Fig. 95; (155) *holotype* S1109.

Fig. 156. *T. miskini gaura* (Doherty): *Plebeius* (*Theclinesthes*) *eremicola* Röber *neotype* S1110.

Fig. 157. *T. hesperia hesperia* n. *holotype* S1138.

Australia — 40 and 85 km N of Esperance 2♀ 3., 4. xi. 1974 *GM*; Kalgoorlie district - Kie 1♂ 27. iii. 1918 BMNH (W. J. Brooks); Mt Singleton 700 m 1♂ w 10. viii. 1963 ANIC; Stirling Range - Bluff Knoll 9♂ 25. xii. 1975 *DC*; Bunbury 2♀ (4., 13. ii.) 21♂ 10♀ (23. iii. - 28. iv.) 1929, 20♂ (21. iii. - 27. iv.) 1♂ (w) (7. iv.) 1930, 1♂ 1♀ 1. iv. 1939, 1♂1♂ (w) 1♀ 3♀ (w) 22. iv. 1943, (F. I. Whitlock) AM - 1♀ 2. xii. 1961 ANIC, 1♂ 7. xi. 1974 *AS*; near Perth - (S of) Mandulah 13. xii. 1963 ANIC, 1♂ (w) 2♀ w v. 1975 *AS* - "Peel Is." [? Peel Inlet] 4♀ *JJ* BMNH - Perth 1♂ 2♀ (C. M. Worsfold) BMNH, 1♂ 6. ii. 1973 *JA*, 1♀ 4. i. 1961 *MM* - Kalamunda 1♀ (R. E. Turner) BMNH - Lesmurdie 1♀ (w) 29. x. 1961, 1♀ 12. xi. 1963, *FP* ANIC - S. Yunderup 2♀ 3. ii. 1975, Chittering 1♀ 31. x. 1961, Wembley 1♀ (w) 21. xi. 1961, Crawley 1♂ 12. ii. 1934, ANIC - Freemantle 3♀ (w) (v. vi.) 1♂ 1♀ (28. vi., xii.) 1961, 1♂ 27. xii. 1963, *FP* ANIC; Geraldton 4♂ 18. x. - 2. xi. 1886 BMNH, 5♂ 1♀ 12. - 15. xi. 1913 *GW* AM, 3♂ w 24., 25. vii. 1972 *RG*; Mooyoonooka 2♂ 7. xi. 1912, Glenfield 2♂ 1♀ 8. xi. 1912, *GW* AM; Drummond Cove 11 km N of Geraldton 4♂ 1♂ (w) 2♀ (w) 22. - 25. xi. 1974, Moresby Range - Oakjee district 1♂ (w) 2♀ 13. x. 1974 on *Acacia tetragonaphylla* (N. McFarland) *AS*; Carnarvon 1♂ 1♀, N. W. Australia 1♂, *GW* AM; Roebourne 15♂ *BB* BMNH, 7♂1♀ *GW* AM; Mt Brockman 4♂2♀ (13. - 21. x., 15., 16. xi.) 1971, Koodaideri 1♀ (1. iii.) 1♂ 1♀ (16. v., 25. vii.) 1971, (K. Tsuji) KU; 108 and 171 km SSE of Carnarvon 4♂ 21. vi. 1968, 6 km SE by S of Minilya 1♂ (w) 1♀ 17. x. 1970, 16 km S by W of Onslow 4♂ 3♂ (w) 18. x. 1970, 4 km SSE of Dampier 6♂ 18. x. 1970, 6♂ (w) 2♀ (w) larvae on *Sesbania cannabina* emerg. 11. - 13. v. 1971, 1-2 km ENE of Millstream 2♂ (22. x.) 1♀ (6. xi.) 1♂ (4. xi.) 1970, Millstream 1♂ 9. xi. 1970, 1♀ larva on *S. cannabina* emerg. 7. v. 1971, 373 km SW of Broome 3♂ 4♀ (w) 2♀ 29. vi. 1972 (N. McFarland), ANIC; Broome 1♀ (w) vii. 1939 AM; Ivanhoe 1♀ 8. iv. 1962 ANIC; Baudin Island 1♂ 1♀ (vi., viii. 1891) 3♂ (-) (J. J. Walker), Dirk Hartog Island 2♂ xi. 1890 (Walker), Queens Island 1♂ vi. 1890 *GS*, between Gascoyne River and Fortesque River 1♂ 2♀ (-) 1♂ 22. xi. 1909, Sherlock River 5♂ *R*, Hermite Island 1♂ 24. ix. 1952, Monte Bello Island 1♂ 29. viii. 1952, S. Heywood Island 1♂ 1♀ v. 1890 (Walker), Cassini Island 6♂ v. 1891 (Walker), Condillac Island 1♀ v. 1891 (Walker), Cape Bougainville - Parry Harbour 1♀ ix. 1891 (Walker), N. W. Australia 8♂ 1901 (P. I. Lathy) *CO* 5♂ 3♂ w 4♀ (Clement), BMNH. Northern Territory — Plenty River area 53 km S of No. 4 Bore 1♂ (w) 8. vii. 1973 NMV; between Yuendumu and Alice Springs 1♀ 4. xii. 1970, Yuendumu 290 km NW of Alice Springs 4♂ 3♀ 1. - 7. xii. 1970 (K. Omoto), ANIC; Tennant Creek 1♂ v. 1972 *JK*; 30 km N of Wauchope 2♀ 13. x. 1972, Howard Springs 1♀ 5. xi. 1973, ANIC; Brock's Creek 1♀ xi. - xii. 1902 (Tunney) *R* BMNH, 1♂ 3♀ (29., 30. iii. 1929) 6♂9♀ 31. i. - 27. iii. 1930 (T. G. Campbell) AM and ANIC; Mary River - Hector's Camp 5♂ 1♂ (w) 6♀ 1♀ (w) 24., 25. vi. 1933 AM; Pt Stuart - Shady Camp 1♂ 21. vii. 1970 *JA*; Elsey Creek 19 km SSE of Mataranka 1♀ 14. v. 1973, Birraduk Creek 18 km NE of Oenpelli 1♀ 1. vi. 1973, ANIC; 32 km NE of Oenpelli 1♀ 11. xi. 1970 AM; East Alligator River - 7 km NW by N of Cahills Crossing 2♂ (14. xi. 1972, 27. v. 1973), 16 km E by N of Mt Cahill 1♂ 1♀ 16. xi. 1972, 15 km NE of Mt Cahill 2♂ 23. v. 1973, Koongarra 15 km E of Mt Cahill 2♂ 3♀ 7. - 8. iii. 1973, Nourlangie Creek 8 km E of Mt Cahill 3♂ 27. x. 1972, 5 km NW of Batchelor 2♂ 5♀ 8. vi. 1973, 32 km S of Darwin 1♀ 22. xi. 1970, Berrimah 1♀ 21. x. 1955, 5 km NW of Daly River Mission 1♀ 19. i. 1974, Daly River Crossing 1♀ 23. i. 1974, ANIC; Darwin 6♂ 3♀ (Dodd) *CO*, 7♂ 6♀ (Walker) *HD-JJ* (part), *GS* (part), BMNH - 3♂ (F. P. Dodd), 5♀ 21. xi. - 21. xii. 1902, 3♀ (Hill), AM - 1♀ v. 1909 SAM; 48 km E of Darwin 1♂ *GW* AM; Melville Island - Snake Bay 2♂3♀ 14. - 21. xi. 1970 ANIC - Fort Dundas 4♀ 3. x. 1933 AM; Bathurst Island 1♀ 5. x. 1933 AM; Cape Wessel 1♂ 26. vi. 1973 *JA*; Groote Eylandt 3♀ 21., 28. i., 18. ii. 1925, N. Australia 1♂ (M. H. Evans), BMNH; Katherine 1♀ 22. iv. 1948, Roper 1♀ iv. 1922, Roper River 1♂, [illegible] 1♂, SAM.

Lucas (1889) based his *miskini* on unspecified numbers of ♂ and ♀ from Mackay and Brisbane. Of these syntypes we have been able to locate a ♂ (Fig. 12) from Brisbane in SAM, which is species A. This worn specimen agrees with the original description and rather poor figures of the ♂, although the latter figure has, besides the usual caudal spots on the hindwing above, another terminal spot in the space between M_3 and CuA_1, a feature which occurs only infrequently in species A and actually is missing in the syntype ♂. In *GW* of AM there is a ♀ of species A labelled "Brisbane, Q. T. P. Luc" and "41066" and 1♀ of species B (=*onycha*) labelled "*Lycaena/Miskini/* Bris. ♀ Lucas" and "41064". They, and especially the latter, do not agree with Lucas' description of the ♀ and its figure. In the SAM there are also 1♂ 1♀ A and 1♀ B from Brisbane in the Lucas collection, but dated 1910-1914; in the *R* of BMNH there are 1♂ of B with no locality label but labelled "*Lycaena miskini* (Lu-

cas)" and "26. 12. 90" and 1♀ of A from Mackay labelled "*L. miskini* ♀" with no date. Obviously, all but the last are immediately excluded from syntypes of *miskini*. We have no other choice but to designate the only located syntype ♂ as lectotype of *miskini*. It represents the summer form of species A, which has previously been known under the name "*onycha*". It is of course possible that Lucas' syntypes also contained some specimens of *T. onycha capricornia* n., but this cannot be substantiated. The unfortunate consequence of this designation is the reversal of the current association of biological and nominal species for *T. miskini* and *T. onycha*. In the following we give a brief account as to how we believe the two "misidentifications" arose.

It was never realised that the original figure of *Utica onycha* Hewitson, 1865 represented a winter form, probably from the Sydney area. Having material from various localities of Queensland before them, earlier workers like Herrich-Schaeffer (1869) and Semper (1878) mentioned the inferior quality of Hewitson's figure of *onycha* without suspecting that they might have been dealing with another taxon. Of these, Semper's material involved both species A (=*T.* "*onycha*" of authors, nec Hewitson) and B (=*T. onycha capricornia* n.). According to Druce (1902), Lucas probably held his *Lycaena miskini* as distinct from *Utica onycha* Hewitson, although only knowing the latter from the original description. Kirby (1879) published the catalogue of Hewitson's collection and listed 4♀ of *Lycaena onycha* Hewitson from "Port Denison" ("discovered" by Captain Sinclair in 1859 and renamed as Bowen in 1863). Their label data are compatible with Bowen as the locality (see p. 6-7), although only those of No. 1 specifically mention Port Denison. However, of these 4♀ we interpret Nos. 1 and 2 as coming from Queensland and representing species A, and Nos. 3 and 4 as coming from N. S. W. and representing species B (=true *onycha*) (p. 7). Druce stated that he had compared "*Theclinesthes eremicola*" as reported by Pagenstecher (1900) from the Bismarck Archipelago (=*T. miskini arnoldi* (Fruhstorfer)) as well as many specimens from Australia and Papua New Guinea with the "type" of *onycha* and found them as conspecific. It is probable that he assumed Kirby No. 1 from Port Denison (or No. 2; both species A) as the "type" of *onycha*. In fact, he joined the earlier authors from Europe when he stated that Hewitson's figure of *onycha* (=species B winter form) was "too highly coloured". However, this action of Druce's does not constitute the restriction of Hewitson's syntypes or the sense of *onycha* to species A, because he did not explicitly state that they consisted of two taxa. Waterhouse (1903) was apparently under the influence of these earlier workers and held the view that "[Hewitson's] figure represents a form which is rather the exception than the rule", which is correct as long as one deals with the summer form. However, Waterhouse (1903) was then describing the winter form ♂ of species A with a strong white postdiscal suffusion from Sydney area (Fig. 13) as *U. onycha* var. *atrosuffusa*, his "*onycha*" obviously constituting a mixture of both species A and B.

Waterhouse & Lyell (1914) recognised the composite nature of what had then been treated as a single species *onycha* and separated the species having bluish upperside in ♂ from northern Queensland (Torres Strait Islands and Kuranda), Darwin and Sydney as "*onycha*", from that having lilac upperside in ♂ from Ingham, Queensland, to Sydney along the east coast of Australia as well as Western Australia as "*miskini*". They indicated that the former fed on *Acacia* while the latter fed on *Macrozamia**. The two "species" they recognised were allopatric except in Sydney. Thus, *Lycaena miskini* Lucas described from Brisbane and Mackay was adopted as the name of the latter taxon while they "believed" that the ♀ type of *onycha*, its figure being "poor", represented the former. In so believing, they might have been influenced by Kirby (1879), who listed all 4♀ of "*onycha*" from Port Denison, mid-northern Queensland. Unfortunately, "*miskini*" of Waterhouse and Lyell (1914) still contained both species A and B, as can be substantiated by a fair agreement of their data of "*miskini*" with the data of specimens of A and B in *GW*. However, their work established the association of nominal species *miskini* with *Macrozamia* as the food plant, and *onycha* with *Acacia*. Fruhstorfer (1916) and Seitz (1923) failed to appreciate the idea of there being at least two species in the complex in Australia. Waterhouse (1932) tried again to rectify, at least in part, the composite nature of his former "*miskini*" by transferring a part of A from south Queensland and of A from Western Australia

*We have not been able to deduce the specific assignment of Waterhouse and Lyell (1914) using specimens' data before 1914 in the *GW* at the AM. From Kuranda there are 1♂ 4♀ *capricornia* specimens (i., ii., iii. and v.,) but only 1♀w (vi.) of *eucalypti*, whereas they gave Kuranda (i., ii., iv. and v.) only for their "*onycha onycha*" (?=*eucalypti*) and not for their "*miskini*" (?=*capricornia*). Probably their "*onycha onycha*" was also a mixture of both species A and B.

from "*miskini*" to "*onycha*": his true "*onycha*" was thus typified by the blue race of species A from northern Queensland (*T. miskini eucalypti* n., p. 21) and his "*miskini*" signified species B. Later Australian workers have consistently followed this pattern set by Waterhouse and thus unwittingly perpetuated the misidentifications. However, Waterhouse (1937) was actually aware of the need of a reappraisal of the whole matter, which he apparently tried with N. B Tindale then in SAM, though without success (Tindale, pers. comm.). Common & Waterhouse (1972), though aware of the problem, left it unresolved.

There is a significant geographic, mostly clinal, variation of the summer form. Several representative form may be noticed. The winter form is known of all of them, but they are hard to define for the reasons to be mentioned below.

(1) (Figs. 64-66, 126-129) In mid-coastal Queensland from Rockhampton to Mackay, and inland at least to Expedition Range, the ground colour is more bluish silky lilac in ♂ above (but may be lilac in worn specimens); beneath clearly marked, greyish and less brown and the caudal spots are more strongly marked than in those from Brisbane and southward.

(2) (Figs. 12-15, 34, 35, 67-74, 130-133) From Brisbane to near Sydney, the ground colour above in ♂ is silky lilac and beneath more brownish grey than the preceding form.

(3) (Figs. 75, 76, 134, 135) In South Australia the postdiscal suffusion beneath is rather limited; the colour above may be dark lilac in ♂ and dark blue in ♀ from the Flinders Range. The middle part of the postmedian band on hindwing beneath is sometimes very strongly displaced distad. This last character is shared by a specimen from Victoria.

(4) (Figs. 77-81, 139) In the southern half of the west coast of Western Australia, the ♂ above is silky lilac, beneath dark greyish brown with very conspicuous white linings, and postdiscal suffusion on hindwing is often limited but quite whitish. As in (3),)the milddle part of the postmedian band may be strongly displaced distad.

(5) (Figs. 24, 36, 37, 82, 83, 125, 136-138, 140, 141) In the arid inland including Mitchell, Queensland, to north-western Australia including Dampier and Broome, W. A., on the west coast, the size is otfen small; wings are pale on both sides in both sexes and less strongly marked. However, frequently the terminal dark line is broader and the cell-end bar of the forewing and the veins of both wings are clearly marked dark in ♂ above. Remarkably enough 1♀ from Clermont, 1♀ from Ayr, 1♀ from Wowan and bred specimens (2♂2♀) from Bowen (Fig. 36), mid-northern Queensland, seem to belong to this form, although Bowen and Ayr are situated on the coastline.

(6) (Figs. 38-40, 84, 85, 142, 143) In the northern coastal area of Northern Territory, including Cape Wessel, and Ivanhoe, W. A., the population is variable, and constitutes a partial transition from (5) to subsp. *eucalypti* n. Thus, ♂ above may be definitely bluish or lilac, sometimes with broader dark margins like some of (5); beneath the postmedian band on hindwing is either displaced as in (1), (2) and (5) or straight as in *eucalypti*. ♀ sometimes clearly marked on both surfaces as in *eucalypti*.

The less well known winter form is generally smaller and has all the features enumerated above (p. 3), or part of them in various combinations. However, it is difficult to assess the extent of geographic variation in the winter form, because examined specimens from the rather few localities cover a complete cycle of seasonal variation and also because the winter form are extremely variable. Some examples of the typical winter form are shown in Figs. 13-15, 67, 68, 73, 77-79; in some ♀♀ the blue colour is shiny and intense, with some lilac hue, but never pure blue as in some of the winter form ♀♀ of *onycha* (*s. str.*) (Fig. 6). Intermediate winter forms are exemplified in Figs. 24, 65, 66, 72, 74. Some intermediate winter form ♂♂ may show a remarkable similarity to *onycha* with a more dull lilac ground colour, wider black margins on both wings, and more developed terminal spots on the hindwing above (Fig. 66); but in typical winter form ♂♂ the colour above may be a very shiny blue and the black margins very thin.

Androconia (Figs. 125-143) — Usually not abundant; general shape is longer than broad, distally rounded but sometimes straight and square or concave at the middle, with 12-15 (but rarely 10, 11, or 16-18) ribs with nodules of moderate size on a colourless ground. In some specimens from Yunta, S. A. (Fig. 135), Mt Brockman, W. A. (Fig. 137), and East Alligator River, N. T. (Fig. 143), scales having fewer ribs (10-11) and larger nodules, somewhat similar to the ones common among *T. m. eucalypti* n., were encountered. Many specimens from dry inland and Western Australia have significantly longer androconia, and in specimens from near Alice Springs, N. T., and Dampier, W. A., scales are

quite long with 12 ribs having small nodules (Figs. 140, 141). In bred specimens from Bowen (Fig. 36) and some other specimens caught in arid areas including 1♂ from Cape Wessel, N. T. (Fig. 40), very few or no androconia were found.

Distribution, habitat and life history — The nominotypical subspecies is distributed widely throughout mainland Australia and coastal islands. Its range is contiguous to that of *T. m. eucalypti* n. in northern Queensland; the borderline seems to be between Townsville and Ayr, north of Bowen, and to extend westward somewhere north of Clermont or Charters Towers. The area around Bowen is relatively dry and probably serves as an ecological barrier. In the coastal area of Northern Territory it shows some transition to *eucalypti*. It is common in northern and western parts of Australia but less common or rare in its south-eastern part and only a limited number of specimens have been collected from southern Victoria and southern S. A. Near Sydney it apparently used to be locally common, but we now find it to be exceedingly rare. It is apparently not uncommon in the dry inland near its food plants. In N. S. W. ♂♂ are more frequently observed hilltopping where the butterfly is predominantly arboreal; perhaps this is why there is a preponderance of ♂♂ in many collections made in the hilly eastern States as contrasted to the higher proportion of ♀♀ in collections made in Western Australia and Northern Terriotry.

This and most other subspecies of *T. miskini* occur in a number of small islands in their range. The fact may be related to the wide, often pelagic distribution of *miskini*, which is not shared by other species of the complex.

The subspecies has been repeatedly found feeding on various species of *Acacia* (Mimosaceae) including galls growing on them. Other food plants are *Sesbania cannabina* (Papilionaceae) from northwestern Australia or some other leguminous plants in mid-north Queensland (Common & Waterhouse, 1972). No detailed comparison of the early stages of *T. miskini* (Lucas) and *T. onycha* (Hewitson) has been reported.

Comments — Kirby specimen No. 1 of "*Lycaena onycha*" in the Hewitson collection labelled "Port Denison" appears to belong to this subspecies rather than *eucalypti* n. because of the slightly displaced middle part of the postmedian band on the hindwing beneath, although there *is* a variation in this character in both subsp. *miskini* and *eucalypti*. In appearance it belongs to geographic form (1) or (2), although specimens obtained from Bowen in recent years belong to form (5). Kirby No. 2 from "Queensland" is similar to No. 1.

T. miskini eucalypti subsp. n. (Figs. 16-18, 41, 42, 86-88, 144-149)

?〔*Utica onycha* Hewitson; Semper, 1878: 166 (part). Misidentification.〕
〔*Theclinesthes onycha onycha* Hewitson; Waterhouse & Lyell, 1914: 109 (part). Misidentification.〕
〔*Nacaduba onycha onycha* Hewitson; Fruhstorfer, 1916: 124-125 (part). Misidentification.〕
〔*Nacaduba onycha* 〔*onycha*〕 Hewitson; Seitz, 1923: 918 (part). Misidentification.〕
〔*Theclinesthes onycha onycha* (Hewitson); Common, 1964: 114-115, fig. 458 (part); McCubbin, 1971: 93 (part). Misidentification.〕
〔*Theclinesthes onycha onycha* Hewitson; D'Abrera, 1971: 359 (part). Misidentification.〕
〔*Theclinesthes onycha onycha* (Hewitson): Common & Waterhouse, 1972: 397-398 (part). Misidentification.〕

Types — *Holotype* ♂, AUSTRALIA: Queensland, labelled "11 miles 〔18 km〕 SW of Mt. Garnet, Q., 20. Apr. 1969 I. F. B. Common & M. Upton 2500ft 〔750 m〕" in Australian National Insect Collection (Registered Type No. 3282); *paratypes* : 98♂ 58♀: Cape York - Lockerbie area 1♂ 2♀ 13.-17. iv. 1975 EUQ - 1♂ 1♀ xi. 1908 (Elgner), 1♀ (5. iii.) 1♀ (15. iii.) 1906, 1♀ 26. x. 1910 (Elgner), *GW* AM; Weipa larvae on leaves of *Eucalyptus* sp. emerg. in Sydney 1♂ (w) (3. vii.) 1♀ (w) (5. vii.) 1973 *JA*; Claudie River - 1♂ 6. v. 1969 *JA*, 1♂ (v. 1961) 2♂ (8. v. 1966) 2♂*(16. xii.) 2♂*1♀*(xii.) 1971, Iron Range 1♂ (14. iv.) 2♀ (7., 15. iv.) 1964, ANIC - Mt Lamond 1♂ 2♀ 11.-15. i. 1972, 4 miles 〔6 km〕 NE of Mt Lamond 2♂ 22. xii. 1971, AM; Coen - Mt White 7♂ 5♀ 8., 9., 10., 11., 12., 13. i. 1964 *MM*, 2♂ 1♂ (w) 6. vii. 1976 EUQ and *AS* (1♂ (w)); Junction of Cape York and Weipa Roads 1♀ larva ons *Atalaya variifolia*, pup. 30. xi., emerg. 6. xii. 1974 *MM*; Peach Creek Crossing 25 km NNE of Coen 1♂ 4.-5. vii. 1976 EUQ; Cape York Peninsula - Dulhunty River Telegraph Crossing 3♀ (w) 2.-4. vii. 1975 EUQ and *AS* (1♀ (w)) - Split Rock 14 km S of Laura 1♂ (w) 23. vi. 1975, hilltop 5 km N of Mus-

grave 1♂ 1♂ (w) 1♀ (w) 7. vii. 1976, EUQ - 9 km S of Archer River via Coen 3♂ 28. vi. 1975 EUQ and *AS* (1♂) - Sandstone hilltop 12 km N of Hopevale 2♂ (w) 15. vii. 1976 EUQ and *AS* - 20 km SE of Laura 2♂ (w) 1♂ w 8. vii. 1976 EUQ and *AS* (1♂ (w)) - Sandstone outcrops 30 km of Fairview via Laura 3♂ 3♂ (w) 1♀ 22.-24. vi. 1976 EUQ and *AS* (1♂ 1♂ (w)); Cooktown - 1♂ 2♀ 13. i. 1960 *MM*, 1♀ on *Acacia* sp. emerg. 19. ix. 1972 *AA*, 1♀ 14. x. 1902 1♂ (7. x.) 1♂ (26. xi.) 1904 *GW* AM; Cedar Bay 2♂ 6♀ 1♀ (w) (Meek) *R*, BMNH; Mossman 1♂ 13. iii. 1964 ANIC; Tinaroo 750 m eggs on *Eucalyptus polycarpa* emerg. 1♂ (-) 2♀ (29.) 2♀ (30.) iv. 1972 (Tindale and McFarland) ANIC, 1♂ (w) 1♀ (w) (1.) 1♂ (w) (6.) vii. 1972 (Tindale) SAM; Cairns 1♀ xii. 1897 (de la Garde), 1♀ *R*, BMNH - 1♀ (Dodd) SAM; Kuranda 1♀ (w) vi. 1902 (R. E. Turner) *GW* AM - 1♂ *23. iii. 1952 ANIC 1♂ iii. 1908, 2♂ w 1906 1♂ 2♀ x. 1919 (Dodd) *CO*, 1♀ xii. 1897 (de la Garde), 1♀ *R*, BMNH; Kennedy Highway - hilltop near Clohesy River 18.5 km from Kuranda 4♂ 1♀ 29. iv. 1976 *NQ* (1♂ each to be deposited in NMV and OM); approx. halfway between Kuranda and Mareeba 1♂ 1♀ 7. iv. 1971 *MM*; Mareeba 2♂ 27. iii. 1968 (Kerr) *AS*, 1♂ (28. iii.) 1♀ (1. iv.) 1968 (Kerr) *JK*; Atherton 1♂ 26. iii. 1906 *GW* AM; Tully 1♀ w 15. v. 1969 ANIC; labelled as ***holotype*** 6♂ 1♂ (w) (1♂ to be deposited in USNM), 4 miles [6 km] ESE of Mt Garnet 2500 f [750 m] 5♂ 1♂ (w) 1♂ w 21. iv. 1969, 7 miles [11 km] SSW of Mt Garnet 2300 f [700 m] 5♂ 1♂ (w) 20. iv. 1969 (1♂ to be deposited in ZMB), 9 miles [13 km] W of Paluma 3018 f [920 m] 1♂ (w) 1♂ w 16. iv. 1969, 10 miles [14 km] W of Paluma 1♂ w* 1♀ w* 8. v. 1970, Mutarnee 1♂ 13. iv. 1969, ANIC; Herbert River - Macnade 3♂ iv. 1912, Herberton 1♂ 20. xii. 1910 *GW*, AM; Townsville - 1♂ 3♀ *JJ* BMNH, 2♂ 1♀ 19. iii. 1944 CM - Castle Hill 1♂ 2. i. 1960, Crystal Cascade 1♀ 29. v. 1960, *MM*; Mt Spec 1♀ w* [larva on a phyllode *Acacia* sp. attended by green ants *Oecophylla*, emerg.?] 6. v. 1969 (Sands) ANIC.

Other material examined — Queensland — 1♂ (w) (Miskin) *GS*, 1♂ 3♀ *JJ*, BMNH; Desailly Range 30 km W of Mt Carbine 1♂ 23. vi. 1975 EUQ; "Kuranda (?)" 1♀ (Dodd) SAM; "Gayndah" 1♂ AM. ?New South Wales — "Sidney" 1♀ (Mathew) *GS* BMNH.

Holotype (Fig. 16) — ♂ summer form, 14 mm; above dull silky greyish blue, deeper blue basad hindwing; terminal lines, veins of both wings and middle discocellular of forewing finely dark; caudal spots moderately marked, surrounded by faint greyish white areas; cilia basally dark, distally white but slightly chequered on hindwing; tail long and filamentous; beneath brownish grey, bands with well marked dark and white linings; postmedian band peripherally wavy but straight as a whole, not displaced distad between M_1 and M_3; caudal spots conspicuously marked.

Paratypes— ♂ and ♀, 11-15 mm. ♂ above ground colour usually greyish blue but sometimes light lilac with occasional transitional individuals; blue colour stronger and less silky in some winter forms; white costal suffusion on forewing only weak, if present; terminal spots sometimes prominent on both wings, developing into long, wedge-shaped, dark, radial basad intrusions in some specimens (Fig. 18), a trend more prominent among specimens from the northern areas of the range; beneath more brownish in summer, darker grey in winter (Fig. 41; Fig. 42 for ♀) with darkened bands (Fig. 86; Figs. 87, 88 for ♀) and prominent costad and basad expansion of whitish postdiscal suffusion (Fig. 86; Fig. 87 for ♀) sometimes to the extent that postdiscal area of both wings are almost completely snowwhite with very conspicuous white linings of bands (cf. Fig. 42 for ♀); caudal spots larger and strongly marked in summer forms, may be very weak in winter forms. ♀ above like nominotypical subspecies; lilac or blue lilac areas weaker in summer, more strongly developed, more bluish (Fig. 42) and sometimes very clearly marked (Fig. 87) in winter; beneath as in ♂, the postmedian band usually straight but see Fig. 88 for exception; otherwise as in *miskini* (*s. str.*).

Androconia (Figs. 144-149) — Typically abundant as in *onycha* (*s. str.*); small, roundish and squat, with brownish ground colour and larger nodules on fewer (11-13) ribs than in those of *miskini* (*s. str.*), although exceptions exist. Typical androconia are present in both blue and lilac ♂ forms.

G. Semper (1878) was the first to record "*onycha*" from Cape York and Cooktown, but whether he had *eucalypti* besides *capricornia* could not be determined. Waterhouse & Lyell (1914) appear to have restricted their "*Theclinesthes onycha onycha*" to this taxon, but examination of his collection casts doubt whether it did not include some *capricornia* especially ♀♀ (see footnote on p. 19). Waterhouse (1932) vaguely relaxed the concept of previous "*onycha onycha*" and admitted some *miskini miskini* into it. Common (1964) and Common & Waterhouse (1972) held that the typical "*onycha*" was repre-

sented by "silky blue" or "dull blue" ♂♂ from north-eastern Queensland, north from Paluma and Mt Garnet. The circumstances under which this confusion arose has been outlined above (p. 19–20).

Waterhouse & Lyell (1914) also included specimens of coastal N. T. in this subspecies, but we have failed to find any silky blue ♂ specimens from that area in the *GW*, although as mentioned above, some bluish ♂ specimens with a straight postmedian band on the hindwing beneath do occur among population there. However, the androconial characters of these specimens are quite variable, and only occasionally approach the likeness of those of *eucalypti* (Fig. 143). In one ♂ from Cape Wessel androconia were entirely missing like in some inland specimens of *miskini* (*s. str.*) form (5). We have excluded these populations of N. T. from *eucalypti*.

The subspecies may be distinguished from *miskini* (*s. str.*) by the abundant roundish brown androconia, the usually blue upperside in ♂, and by the usually straight postmedian band on the hindwing beneath (useful for ♀♀ and lilac ♂♂); from *arnoldi* by androconia and by the absence of terminal pale lunules in the ♂ hindwing above. From sympatric *T. onycha capricornia* ♂ it can be distinguished by its generally smaller size, blue ground colour above, greyish rather than brown ground colour beneath with bands having conspicuous dark as well as white linings, and characteristic androconia; ♀♀ may be more difficult to distinguish from *capricornia* ♀♀ but the aforementioned characters beneath may be used as criteria.

The subspecific name *eucalypti* is the genetive of *Eucalyptus*, one of the food plants of the subspecies.

Distribution and habitat — The southern limit of this subspecies reaches Townsville. Whether it occurs around Charters Towers and Bowen along with, or replacing, *miskini* (*s. str.*) needs further verification. The extent of gradation *eucalypti* may show towards *miskini* (*s. str.*) along the north-east coast of Queensland remains to be determined; the extent of gradation in its western transiton is not known either. Specimens from the west coast of Cape York (Weipa) are still typically *eucalypti*, but a ♂ from Cape Wessel, the north-eastern tip of N. T. is less bluish and has character more in common with the inland form (5) of *miskini*. It is conceivable that in the east, *eucalypti* and the coastal form (1) of *miskini* (*s. str.*) are separated by the inland form (5) of *miskini* (*s. str.*) around Bowen (see p. 21), but in the west *eucalypti* may have a smooth, gradual transition to the inland form (5) or north coast form (6) of *miskini* (*s. str.*).

Although some worn ♂♂ tend to be consistently lilac above, there are fresh lilac ♂♂. Both blue and lilac ♂♂ have been collected together at the same locality (Mareeba) on the same day (J. F. R. Kerr, pers. comm.); they may represent a genetic polymorphism, and *eucalypti* is similar to *arnoldi* in this respect.

Life history — N. B. Tindale (pers. comm.) with N. McFarland discovered eggs and larvae on young terminal leaves of a small sapling of *Eucalyptus polycarpa* P. vM. (Myrtaceae) at Tinaroo, north Queensland, in 1972. Larval and pupal period lasted 1 month and 2 weeks, respectively, during May-July. At Weipa (May 1973) A. and J. d'Apice (pers. comm.) collected some larvae on an unidentified species of *Eucalyptus* having large leaves. These emerged during early July only a few days after the pupae had been brought down to Sydney. These two sets of butterflies have some winter form characteristics, and all the ♂♂ which emerged were blue above. Then M. S. Moulds (pers. comm.) successfully bred, on *Atalaya variifolia* F. Muell. ex Venth (Sapindaceae), 1♀ from a larva he had found on this shrub in Cape York Peninsula. On the other hand, records also exist that larvae of this subspecies were found and bred on *Acacia* (Atkins, pers. comm.; Sands, pers. comm.) and possibly also on a leguminous plant *Desmodium rhytidophyllum* F. Muell., around which blue ♂♂ and some ♀♀ of this subspecies were flying (Quick, pers. comm.). However, only ♀♀ having emerged in all these cases, it is not known whether specimens feeding on *Eucalyptus* on the one hand and on *Atalaya*, *Acacia* and/or some leguminous plants on the other hand in northern Queensland are segregated in external characters, e. g., blue and lilac forms of ♂♂ according to the food plant. It would be of interest to know if *miskini* (*s. str.*) feed on as various plants as *eucalypti* either in its natural habitat or in captivity. At any rate, the fact that this subspecies feeds on *Eucalyptus* is remarkable, it being one of the few Australian butterfly taxa to do so.

Comments — It may be entertained that *eucalypti* is a hybrid between *arnoldi* of Papua New Guinea

and Torres Strait Islands and *miskini* (*s. str.*), especially its form (1), because it has both blue and lilac forms in ♂. However, *arnoldi* also has a lilac form besides the ordinary blue form, and the androconia of *eucalypti* are quite characteristic and distinct from both *arnoldi* and *miskini* (*s. str.*). Furthermore, there is a possiblitiy that *eucalypti* and form (1) of *miskini* are rather well separated around Bowen along the east coast of northern Queensland (see p. 21). The idea is therefore not well founded.

T. miskini arnoldi (Fruhstorfer) **comb. n.** (Figs. 19, 20, 43-45, 89-94, 150-152)

Theclinesthes eremicola Röber; Pagenstecher 1900: 123, pl. 2, fig. 9.

〔*Utica onycha* Hewitson=*eremicola* Pagenstecher; Druce, 1902: 116; Waterhouse, 1903: 240. False synonymy.〕

〔*Theclinesthes onycha onycha* Hewitson; Waterhouse & Lyell, 1914: 109 (part). Misidentification.〕

Nacaduba onycha arnoldi Fruhstorfer, 1916: 125. Holotype ♂ PAPUA NEW GUINEA: Bismarck Archipelago, not located 〔lost〕. NEOTYPE ♂, here designated, New Britain (BMNH) 〔examined〕.

Nacaduba onycha arnoldi Fruhstorfer; Seitz, 1923: 918.

Theclinesthes onycha arnoldi Fruhstorfer; D'Abrera, 1971: 358-359, figs.

Type — Nacaduba onycha arnoldi Fruhstorfer, *neotype* ♂, PAPUA NEW GUINEA, labelled "New Britain Cotton & Webster" and "Rothschild Bequest B. M. 1931-1." in British Museum (Natural History) (Fig. 43).

Other material examined — AUSTRALIA: Queensland — Thursday Island 1♂ 1♀ 16. i. 1939 (R. G. Wind), Prince of Wales Island 1♂ 4♀ (23. vi., 7., 25. v., 17. vi., 2. vii.) 1908 (H. Elgner) *GW*, 3♀ 22. ii, 1939 (H. G. Wind), Banks Island 1♂ 2♀ 16., 22. 1910 (H. Elgner) *GW*, AM; Badu(=Mulgrave) Island 2♀ 18., 19. xii. 1976 (H. Heatwole) EUQ. PAPUA NEW GUINEA: West and East New Britain Provinces — 1♀ 1894 (Webster), 2♀ (Cotton and Webster), 1♂ 1♀ 1897 (Semper), Neupommern - Herbertshöhe 1♀ 10. iv. 1894, BMNH. New Ireland Province — New Hano- ver 1♂ 1♀ ii. 1923 (A. S. Meek) *R* BMNH. Milne Bay Province — Louisiade Archipelago - St Aignan 1♀ ix. 1897 (Meek), Tagula (=Sudest) Island - 1♀ iv. 1898 (Meek) - Mt Riu 600 m 1♀ iii. 1916 (Ei- chhorn Brothers), BMNH; Normanby Island - Sewa Bay, Wakaiuna 1♂ 1♀ 23. x. 1956 - 11. i. 1957 *WB* ANIC; D'Entrecasteau Islands - Goodenough Island 750-1200 m ♀ iii. 1913 (A. S. Meek) BMNH; Milne Bay 1♂ 1♀ (ii.) 2♀ (3. iii.) 1899 BMNH; Tarakwaruru 56 km N of Dogura 3♀ 23. - 25. v. 1967 SAM. Central Province — Port Moresby - 3♂ 4♀ 1908 (G. M. Mathew) *GS* BMNH, 2♂ 1♀ (12. i. 1971, 28. vii. 1974) *AS* - Mt Lawes 390 m 3♂ 6♀ 5. iii. - 12. v. 1963 *WB* ANIC; Rauna 4♂4♀ 29. ix. - 6. x. 1949, Subitana 540 m 2♂ 2♀, Amazon Bay area - Daria 210 m 2♀ 11. xii. 1962 - 9. i. 1963, *WB* ANIC; Mailu 1♂ vii. 1895 (Anthony) BMNH; Baroka 1♀ iv. 1933 (R. Archbold) AMNH; Aroa River 1200-1600 m 1♀ v. 1905 (Meek) BMNH. Northern Province — Kumusi River low elevation 2♂ 5♀ viii. 1907 (A. S. Meek) BMNH. Western Province — Rouku, Morehead River 2♂ 3♀ 19. iii. - 20. v. 1962 *WB* ANIC. INDONESIA: Kep Aru (=Aru Islands) 1♂ 1♀ (H. Elgner) SAM; Kep Kai (=Key Islands) 1♂ i. - iii. 1916 (W. J. Frost), Fordate (=Tenember) (labelled "Tenimber") 1♂ vi. - vii. (Doherty), BMNH.

Pagenstecher (1900) recorded this subspecies as *T. eremicola* Röber from the Bismarck Archipelago based on a single ♂ in Dahl's collection made at Mioko (a small island south of the main Duke of York Island) and Ralum (west of Kokopo), both near Rabaul, New Britain. Druce (1902) synonymised *eremicola* under erroneous authorship of Pagenstecher with "*onycha* Hewitson" and Waterhouse (1903) followed him. Fruhstorfer (1916) later erected *arnoldi* as a subspecies of "*onycha*" based on Pagenstecher's figure. The holotype specimen of *arnoldi* was apparently destroyed during the World War II according to Dr H. J. Hannemann, Museum für Naturkunde, attached to the Humboldt-Universität in Berlin. Fruhstorfer (1916), Seitz (1923) and D'Abrera (1971) never gave any detail of the locality of *arnoldi* holotype beyond Bismarck Archipelago; nor strangely enough has the wide occurrence in the main island of Papua New Guinea of this or allied taxa ever been reported. Species *miskini* seems to be rare around Rabaul, and recent collecting has not yielded any specimens as far as we are aware. There are some rather worn specimens from New Britain in the BMNH, and owing to a lack of any other specimens from that area we have no other alternative than to designate a ♂ from these specimens as neotype which is needed for defining allied taxa.

The subspecies (♂ 10-15 mm, ♀ 9-16 mm) is similar to *gaura* Doherty (= *eremicola* Röber syn. n.),

feminalba ssp. n. and *brandti* ssp. n. in having in ♂, as in ♀, pale subterminal lunules bordering rather strongly marked terminal dark spots (especially the caudal spots) on the hindwing above, and can be distinguished in this point from Australian subspecies, although the upperside blue coloration of both sexes is similar to *eucalypti*. In ♂♂ the colour above is dull silky to sometimes light blue, but some fresh specimens exhibit a lilac tint (a single ♂ from Aru Islands is of this type); as in *miskini* (*s. str.*) and *eucalypti* worn specimens tend to acquire more lilac tint above. In ♀♀ the blue patch above may be extensive, in light blue to blue-lilac often becoming whitish distad, often cilia on the forewing are white and not chequered, and the caudal spots beneath are very conspicuous. Because of the lack of a series of good specimens from the Bismarck Archipelago it is difficult at the moment to say whether there is any systematic difference between the populations there and those from other localities on mainland Papua New Guinea, although we feel that the former ♂♂ have a more reduced blue area on the forewing above than ♂♂ from Papua. However, the blue area in the former is still more extensive and the blue colour more intense than in *brandti* ssp. n. or *feminalba* ssp. n. Specimens from Aru to Fordate may form a graded transition to *gaura* (Doherty) of Nusa Tenggara (=the Lesser Sunda Islands) in that the colour above in ♂ is more lilac than blue often with wider margins, the median band on the hindwing beneath tends to be displaced distad or arched at the middle, and the caudal spots on the hindwing beneath are not exceptionally large.

Androconia (Figs. 150-152) — Large, longer than broad, ribs 13-16, with small nodules, and thus radically different from the typical ones in *eucalypti* ssp. n.

Distribution, habitat and life history — The subspecies is continuous to *eucalypti* in mainland Australia. Thursday Island or the tip of Cape York may be the borderline of the two subspecies, but the area of transition is very limited. It also appears to be continuous to *gaura* in Nusa Tenggara (=the Lesser Sunda Islands) with graded populations on islands ranging from Aru to Timor and Kisar. In Papua New Guinea it occurs at low and middle elevations on the main island and its ancillary islands to the east, and the islands of New Britain and New Hanover (no record is knonw from New Ireland) within the Bismarck Archipelago. Nowhere is it common. Near Prot Moresby we have collected both sexes in savannah-type country, on low eucalypt shrubs near hilltop. They were also hilltopping in eucalypt/cycad type country around 700 m or higher. According Sands (pers. comm.), it was found and reared on *Eucalyptus confertiflora* F. Muell., the larvae being gregarious on very young leaves of bushes 1-1.5 m high which were usually sickly or half dead, and attended by ants of possibly *Crematogaster* sp.

T. miskini brandti subsp. n. (Figs. 21, 22, 153)

Types — *Holotype* ♂, PAPUA NEW GUINEA: Manus Province, labelled "ADMIRALTY ISLANDS Los Negros Is. [2.03 S 147.24 E] 12.4. 1952 Collected by Wm. Brandt Sir Edward Hallstrom" in Australian National Insect Collection (Registered Type No. 3283); *paratypes* 4♂ 9♀: Los Negros Island 2♀ (2. iv.) 1♂ (4. iv.) 2♂ 1♀ (12. iv.) 1♂ (16. iv.) 1♀ (24. iv.) 1♀ (2. v.) 2♀ (-) 1952 *WB* ANIC (1♂ to be deposited in BMNH); Manus Island 2♀ ix.-x. 1903 (Meek's Expedition) BMNH.

Holotype (Fig. 21) — ♂, 14 mm. Above dark brown with silky dull blue scales sparsely distributed from base to 2-3 mm from termen with prominently dark veins on both wings and cell-end bar on forewing; beneath light brown, cilia on both wings chequered; otherwise as in *arnoldi*.

Paratypes — ♂ 13-14 mm, ♀ 11-15 mm. ♂ as holotype; ♀ (Fig. 22) above like *arnoldi* but with dull greyish blue areas dusted with dark scales; they cover the basal 2/3 of the caudal half of both wings, do not become whitish distad and are somewhat smaller than those in *arnoldi*.

Androconia (Fig. 153) — Similar to those of *arnoldi* but may be conspicuously elongated.

The subspecies is distinguished from *arnoldi* by the sparsely distributed blue scales and the more reduced blue area on the forewing in ♂ above, and in the ♀ by greyish tinge of the blue area above without becoming whitish distad.

The subspecific name is dedicated to William W. Brandt, N.S.W., who made an excellent and extensive collection of Lepidoptera in and around Papua New Guinea, which is now a part of the ANIC and includes a majority of the type-series of this subspecies.

Distribution, habitat and life history — Confined to the Admiralty Islands; nothing is known of its habitat and life history.

Comments — As with *arnoldi* and *feminalba* n. ♀♀ have been collected as commonly as ♂♂, which suggests that the butterflies are not arboreal in rainforest but remain close to the food plant (probably in open areas), which has been found the case with other Lycaenidae in Papua New Guinea when both sexes have been collected in comparable numbers. The habitat of *arnoldi* near Port Moresby is certainly compatible with this inference about *brandti*.

T. miskini feminalba subsp. n. (Figs. 46, 47, 95, 96, 154, 155)

Types — *Holotype* ♂, INDONESIA: Irian Jaya, labelled "Humboldt Bay [Jayapura] Sept.-Oct. 1892 W. Doherty" and "Rothschild Bequest B. M. 1939-1." in British Museum (Natural History); *paratypes* 4♂ 13♀: 2♂ 4♀ labelled as holotype BMNH; PAPUA NEW GUINEA: Madang Province—Vulcan [Manam] Island 2♂ 8♀ ix. 1913-i. 1914, Dampier [Karkar] Island 1♀ ii.-iii. 1914, (Meek's Expedition) *R* BMNH.

Holotype (Fig. 46) — ♂ 12 mm. Above dark greyish brown, with distally diffusely bordered dark bluish violet areas confined to basal 2/3 of forewing (including costal area but not space between M_1 and M_2), and subbasal part of caudal half of hindwing; a dark terminal margin of 1 mm and conspicuous dark veins; subterminal pale lunules conspicuous from M_1 to dorsum on hindwing and vaguely marked on forewing from dorsum apicad becoming obscure towards M_1; a terminal row of round dark spots and long filamentous tail on hindwing; cilia mostly white and chequered only lightly on forewing; otherwise and beneath like *arnoldi*.

Paratypes — ♂ from the eastern range (Fig. 95) 13 mm. Similar to holotype but middle of postmedian band hindwing beneath is sometimes slightly displaced distad. ♀ 9-15 mm. Topotypically (Fig. 47) greyish brown with predominantly greyish white markings as extensive as bluish areas in *arnoldi*, only basally very weakly greyish blue, with dark veins and forewing cell-end bar; otherwise as in *arnoldi*; ♀ from the eastern range as in *arnoldi*, sometimes with no distal whitening but sometimes with a considerable whitening of the blue markings on both wings above.

Androconia (Fig. 154, 155) — Similar to *arnoldi* or *brandti*.

The subspecies *feminalba* may be distinguished from *arnoldi* and *brandti* by the more restricted, distally diffusely bordered and dark violet-tinged bluish areas above, which do not cover the space between M_1 and M_2 on the forewing in ♂, and the whitish marking in the typical ♀ above. From *gaura* it may be distinguished by the straight postmedian band on hindwing beneath, darker ♂ and typically white ♀.

The subspecific name is a combination of *femina* (the female, Latin) and *alba* (white, Latin adjective: feminine).

Distribution, habitat and life history — The subspecies occurs along the central north coast, including some ancillary islands, of Irian Jaya/Papua New Guinea, but the ♀ becomes like that of *arnoldi* in the eastern part of its range. Like *arnoldi* in the Bismack Archipelago no specimens have been found among recently made collections. Nothing is known of its habitat and distribution limit but the preponderance of ♀♀ among paratypes suggests that they fly near their food plants.

T. miskini gaura (Doherty) comb. n. (Figs. 23, 48, 49, 97, 156)

Nacaduba gaura Doherty, 1891: 181-182, pl. 2, fig. 8. Holotype ♂, INDONESIA: Sumba (BMNH) [examined].

Plebeius (*Theclinesthes*) *eremicola* Röber, 1891: 316; 1892: pl. 5, fig. 5. Syntypes 1♂ 1♀, INDONESIA: Flores, Alor, not located [lost]. NEOTYPE ♂, here designated, South Flores (BMNH) [examined]. **Syn. n.**

Nacaduba ancyra f. *gaura* Fruhstorfer, 1916: 123; Seitz, 1923: 917.

Nacaduba onycha eremicola Röber, Fruhstorfer, 1916: 125; Seitz, 1923: 918.

Types — *Nacaduba gaura* Doherty, *holotype* ♂, INDONESIA, labelled "Sumba, 1887 Doherty" and "probably type" ex C. Oberthur collection in British Museum (Natural History) (Fig. 23); *Plebeius* (*Theclinesthes*) *eremicola* Röber, *neotype* ♂, INDONESIA, labelled "S. Flores, XI. 96, Dry s. Everett", "Rothschild Bequest B. M. 1939-1.", "Gen. Prep. JNE/1971/6/22", "*Theclinesthes onycha eremicola*

Röber" and "Scale1 110A. Sibatani", abdomen removed, in British Museum (Natural History) (Fig. 48).

Other material examined — INDONESIA: Sumba 1♀ 1887 (Doherty), Flores - Larantuka (=Larentuka) 1♂ v. 1897 (Everett), Pura (near or on Pantar) 8.19 S 124.20 E 1♂ 1♀ x. 1891 (W. Doherty) *R*, Kisar (=Kisser) 3♂ 8. v. 1901 (Kühn), Timor - Atapupu 1♂ viii. 1909 dry season (Everett) *R*, BMNH.

Doherty based his description of *Nacaduba gaura* apparently on 1♂ collected in Sumba in 1887. This specimen is in the BMNH and is probably the holotype. However, there is also 1♀ in the BMNH with the same label data which was not mentioned in Doherty's description of *gaura*.

A search for *eremicola* Röber syntypes has revealed that they are not present in the collection of ZMB according to Dr W. J. Hannemann, Berlin, nor are they in SMT, where, according to a son of Röber, the Röber collection had been stored, but was burnt during the World War II, as we were informed by Mr R. Krause of SMT, Dresden. With the consent of Mr Krause, we designate a ♂ in BMNH from South Flores, one of the syntype localities, as neotype.

Doherty's description of *gaura* was published in *J. Asiat. Soc. Bengal* 60 II(2) on [16 July] 1891 whereas the publication of *eremicola* Röber text in *Tijdschr. Ent.* 34(3/4) was after 18 July 1891 and should be regarded as [31 December] (Cowan, pers. comm.). We conclude that *eremicola* should be treated as a subjective synonym of *gaura*. Doherty (1891) distinguished *Catopyrops ancyra* Felder, 1860 in Borneo from his *gaura* as a separate species *Nacaduba pseustis* Doherty, 1891, which, according to Tite (1963), is a synonym of *C. a. almora* (Druce). Fruhstorfer (1916) and Seitz (1923) treated *gaura* as a form of *ancyra*. Tite (1963) correctly excluded *gaura* from *C. ancyra* and did not include it in his revision of what later became the *Nacaduba* Section (Eliot, 1973). It has since then become obsolete. It has never at any stage been treated as *Theclinesthes*, although in BMNH it was correctly placed among races of *T. "onycha* (Hewitson)".

This subspecies (♂ 11-13 mm, ♀ 11-14 mm) is to be distinguished by the distad displacement of the middle part of postmedian band on the hindwing beneath in both sexes, the lilac upperside with wide dark apical and terminal margins and pale subterminal lunules on the hindwing above in the ♂, causing it to like ♀, and the typically very heavily marked caudal spots on the hindwing beneath with the reduced orange lunule basad of the spot between CuA_1 and CuA_2.

Androconia (Fig. 156) — Similar to those of *arnoldi* but may be elongate and slightly tapering towards the tip which is convex with a blunt apex.

Distribution, habitat and life history — This subspecies is known from a part of Nusa Tenggara (=Lesser Sunda Islands) including Sumba, Flores, Alor, Kisar, Timor, and some nearby islands, but to the east on the Fordate, Kai and Aru Islands it is replaced by some transitional forms to *arnoldi*, which we have referred to the latter in this paper. Nothing is known about its habitat and life history. Indeed, only a very limited number of specimens exist of this subspecies which is the type-species of the genus *Theclinesthes* Röber.

Comments — It is interesting to note that *gaura* is similar to *arnoldi* in the presence of subterminal pale lunules in ♂ above and to *miskini* (*s. str.*) form (4) from Western Australia in the distad displacement of the middle part of the postmedian band on the hindwing beneath. The various *miskini* subspecies and local forms of subsp. *miskini* in Australia may be linked as in Fig. 158. *Eucalypti* and *miskini* (*s. str.*) form (2) are designated as being discontinuous along the east coast of Queensland (see p. 17).

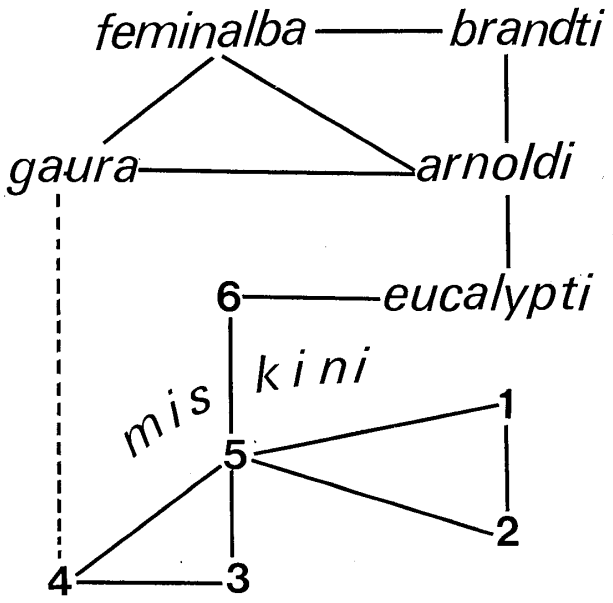


Fig. 158. Interrelationship of the subspecies and infrasubspecific forms of *T. miskini* (Lucas).

Theclinesthes albocincta (Waterhouse)

(Figs. 25-30, 50, 51, 98-109)

Utica onycha var. *albocincta* Waterhouse, 1903: 242. LECTOTYPE ♂, here designated, AUSTRALIA: Queensland (AM) [examined].

Theclinesthes onycha v. *albocincta* Waterhouse; Waterhouse & Lyell, 1914: 110.

Nacaduba onycha onycha Hewitson, [ab.] *albocincta* Waterhouse; Fruhstorfer, 1916: 125.

Nacaduba onycha [*onycha*] Hewitson, ab. *albocincta* Waterhouse; Seitz, 1923: 918.

[*Theclinesthes onycha onycha* (Hewitson); Common & Waterhouse, 1972: 397-398 (part). Misidentification.]

Theclinesthes albocincta (Waterhouse); Grund & Sibatani, 1975: 99.

Type — *Utica onycha* var. *albocincta* Waterhouse, *lectotype* ♂, AUSTRALIA: Queensland, labelled "*Theclinesthes onycha* var. *albocincta* Type Male Waterhouse", "Peak Downs July", "G. A. Waterhouse Collection", "K 69190" and "41545" in Australian Museum (Fig. 25).

Other material examined — Queensland — "N. Queensland" 1♂ *R* BMNH. Victoria — Sunset Country 22 km N of Linga 2♀ 21. xii. 1975, 1♂ 1♀ (larvae on *Adriana hookeri* 21. xii., pup. 25. xii. 1975, emerg. 5. i. 1976) *AB*; Wyperfeld National Park 1♂ 1♀ 4. xi. 1966 (Common and Upton) ANIC, 1♂ 5. xi. 1960 (Hinchliff) *DC*; Lake Albacutya 3♂ 20. iii. 1972 (Landy) *DC* and *L.M. Landy*. South Australia — Simpson Desert 20.36 S 1♂w 1♂(w) 26. -30. vii. 1973 (McCubbin) NMV; Port Gawler 1♂ 1♀ 3. v. 1969, 10♂ 13.-15. i. 1971, 2♂ 4. i. 1972, 20♂ 22♀ larvae on *Adriana klotzschii* (pup. 9.-23. i., emerg. 17. i.-2. ii.) 1972 *AS*, *JK*, *RG* and ANIC; St Kilda 1♂(w) 4. iv. 1971 *RG*; near Adelaide - Henley Beach 1♂ 17. iii. 1935, 1♀ 26. iii. 1936, *FP* ANIC - West Beach 3♂(w) 1♀(w) 3.-14. v. 1936, 14♂ 12♀ (6.-20. iii., 9. iv.) 1938, 9. iii. 1939, 6.-22.* iii. 1940, (F. M. Angel) AM and ANIC; [no data] 1♂(w) ANIC, 1♀(w) *RG*; Robe 2♂ 2♀ 8.-11. ii. 1942 *FP* ANIC; Edithburgh 1♂(w) 9. iv. 1939 *FP* ANIC; Warooka 4♂ 1♀ 2. iii. 1969 *RF*, 5♂w 8♀w larvae on *A. klotzschii* (pup. 9.-21. v., emerg. 25. v.-2. vi.) 1973 *AS*, *JK*, *RG* and ANIC; Stenhouse Bay 1♀ larvae on *A. klotzschii* emerg. 27. ii. 1976 (R. Fisher) *AS*. Western Australia — 13 km N of Dongara 1♂ 8. x. 1970 *JA*; 4 km SSE of Dampier 1♂ 18. x. 1970 (Upton and Feehan) ANIC.

The species *albocincta* was first described by Waterhouse (1903) based on two "poor" (Waterhouse & Lyell, 1914) specimens from Peak Downs, Queensland, as a variety of *Utica onycha*. Of these two syntypes we could locate only one (lectotype) (Fig. 25) in AM. After that, Waterhouse apparently failed to obtain more specimens of this taxon from the same or any other locality. Although Waterhouse & Lyell (1914) suspected it as a geographic race of *onycha*, Waterhouse (1932) dropped it from the list of recognised taxa of Australian butterflies. Since then the name *albocincta* had remained obsolete until Grund & Sibatani (1975) resurrected it as the name of a distinct species from coastal South Australia, which Common & Waterhouse (1972) had mentioned in their desrciption of "*onycha*". Recent search around Peak Downs by A. Atkins (pers. comm.) did not yield anything belonging to this species. The syntypes were collected in July and the lectotype is a winter form and blue above. From coastal South Australia somewhat similar specimens (e.g., Fig. 108) are found among bred specimens of the winter form of the same species, but much darker individuals (e.g., Fig. 106) are also collected in the field. Very dark specimens predominate in inland and western coast of mainland Australia (Figs. 30, 50, 51, 98, 99, 102). A similar dark ♂ specimen labelled "N. Queensland" exists in BMNH, but the record needs verification. Because of the extensive variability of a long series of specimens from coastal South Australia and of the very limited material from some localities, we found it difficult to define more than one subspecies for specimens from these regions. However, a few geographical forms may be described. All these forms lack androconia and, compared with other species, have a narrower forewing with obtuse tornus.

(1) A form represented solely by the lectotype (Fig. 25) from central Queensland inland but east of the Great Divide: ♂w 11 mm; forewing apex not conspicuously pointed; above pale blue with dark veins and clearly marked dark forewing cell-end bar; row of faint terminal dark spots surrounded by conspicuous greyish white rims embedded in broad pale grey-brown terminal margin broadening slightly apicad; tail probably short (tip missing); cilia chequered on forewing, not clear on hindwing (worn);

beneath grey with dark bands; postmedian band on forewing significantly decurved basad from M_2 to costa, and on hindwing remarkably displaced distad between M_1 and M_3 and inconspicuous or virtually broken between M_3 and CuA_2; caudal spots weak, pale postdiscal suffusion somewhat developed on both wings, almost white on hindwing. Extent of individual variation unknown. ♀ unknown.

(2) Southern half of dry inland and central west coast of Australia and doubtfully north Queensland (Figs. 30, 50, 98-102): ♂ 11-14 mm; forewing apex pointed; above predominantly dark, suffused with dull greyish blue from base (Figs. 30, 50) to various extents up to half the wing on forewing and to postdiscal area on hindwing (Figs. 100), but leaving veins and forewing cell-end bar dark, the latter also discernible on dark wing; subterminal pale lunules and terminal spots, especially caudal spots on hindwing, are marked to various strengths; wings darkest in winter forms; cilia chequered, pale patches sometimes brownish in darker form, obliterating the chequered appearance especially on forewing; tail stubby, tip with white cilia; beneath grey-brown to yellowish brown; postmedian band often darker, usually straight towards costa on forewing, usually not broken between M_3 and CuA_1 on hindwing, position of the band between M_1 and M_3 on hindwing variable; postdiscal suffusion conspicuous, caudal spots usually obsolete; cephalic half of hindwing basad of postmedian band sometimes darkly suffused in winter forms. ♀ 11-14 mm; forewing apex less pointed than in ♂; above dark with somewhat shiny blue area spreading from base (Fig. 102) distad to various extents mainly on caudal half of both wings (Fig. 101), but this is usually very vestigial (Fig. 99) and not reaching the pale lunules on hindwing; the latter and terminal spots more conspicuously marked than in ♂; cilia chequered more conspicuously on both wings than in ♂; underside all the bands may be darker than ground colour, but sometimes pale and uniformly coloured (Fig. 99); otherwise as in ♂.

(3) Coastal South Australia around Adelaide (Figs. 26-29, 103-109): summer form ♂ 10-15 mm; wing shape as in (2); above dark with blue areas varying from almost absent and only traces near base as in (2) to fully extended to near apex on both wings (Figs. 103, 104); very fine terminal line, caudal spots on hindwing, veins and forewing cell-end bar well marked in dark; usually with some broad dark terminal band on forewing and some definable terminal spots on hindwing; pale subterminal lunules always weak and often absent, but very rarely it may develop into a terminal row of vague white spots distally bordering the blue area with or without dark band in between (Fig. 103); some dark forms cannot be distinguished from (2) but usually subbasal blue areas are somewhat clearly outlined distally rather than diffusely marked (Fig. 106); cilia clearly chequered in blue forms but somewhat brownish in dark forms; tail short, black with white cilia at tip; beneath as in (2), usually somewhat yellowish, but usually more clearly marked with bands having dark and white linings; postdiscal suffusion usually slight; subterminal and terminal spots on both wings and caudal spots on hindwing usually weak; otherwise similar to (2). ♀ 10-14 mm; wing shape more rounded; above dark with variable blue areas which extend from base and often become paler distad, ranging from a basal or postbasal suffusion (Fig. 107) to a prominent patch leaving broad costal and terminal dark borders which broaden apicad on forewing and broad costal dark area on hindwing (Fig. 27, 105); cell-end bar on forewing and pale lunules and terminal and caudal spots on hindwing are more conspicuous than in ♂; cilia chequered black and white but white predominating on forewing; beneath like ♂, portion of postmedian band between M_3 and CuA_1 on hindwing may sometimes extend towards caudal spot.

Winter form ♂ (Figs. 28, 108, 109) 14-15 mm; generally larger in size with less straight costa and termen and less pointed apex of forewing than in summer forms; above blue areas very extended, often quite to termen on both wings, silky and purer blue, subterminal lunules also light bluish; cilia more clearly chequered black and white than in summer forms; beneath dark grey-brown often with extended whitish postdiscal suffusion; bands on hindwing usually dark brown, sometimes with darker suffusion in cephalic half. ♀ (Fig. 29) 12-14 mm; above in deeper blue, especially proximad and more extensively than in summer forms; subterminal pale lunules of hindwing bluish; beneath as in ♂.

(4) North-western Australia (Dampier) (Fig. 51): ♂ 11 mm; wing form like (3); above yellowish grey-brown, without blue scales, paler proximad, especially on forewing; veins on forewing darker with somewhat darker cell-end bar; on hindwing both subterminal greyish lunules and terminal spots vestigial; cilia light brown on forewing, chequered in light and dark brown on hindwing; tails somewhat longer than in (3), tipped white; beneath pale yellowish brown with bands almost of the same colour with inconspicuous dark and white linings, broader than interband spaces on forewing; postmedian band straight on forewing, broken on hindwing between M_3 and CuA_1; subterminal and termi-

nal spots, especially caudal spots, and postdiscal light suffusion are weak.

With only one specimen being known from each of (1) and (4), their differences from the other forms are not well established. Nonetheless, (1) is characterised by more prominent whitish terminal markings above than any specimens so far known of (3). The pale underside of (4) ♂ is fairly well matched by a (2) summer form ♀ from inland Victoria but the (4) ♂ is remarkably yellowish above. The variation range of (3) seems to surpass the whole range of (2), often with more developed or sharply outlined blue areas in both sexes. The typical winter forms of (3) were reared from larvae in Sydney and may represent artefacts. Also, (2) summer forms reared in Melbourne appear to be more bluish than the average specimens collected while flying in their natural habitat.

Distribution, habitat and life history — Form (3) has so far been found only in South Australia. There it is confined to coastal areas with salty sandy soil, where its food plant *Adriana klotzschii* (F. Muell.) Muell.-Arg. grows. It ranges from Robe in the south-east of South Australia, through the Adelaide area, and westward from various localities on Yorke Peninsula and extends to Coffin Bay, Eyre Peninsula (Fisher, pers. comm.). It apparently used to be common along Adelaide beaches, but housing development has cleared its food plant away. The eastern and western limits of its range has not been determined. The life history of (3) was recorded by Grund & Sibatani (1975) but a detailed comparison of early stages with those of other taxa or other populations of the same species has not been made yet.

Form (2) occurs in dry inland, especially around salty inland lakes. Larvae were found on *Adriana hookeri* (F. Muell.) Muell.-Arg. in inland Victoria (Bishop, pers. comm.). The same plant is known from Simpson Desert (Everist, pers. comm.) and inland Western Australia near the border of Northern Territory and South Australia (Kenneally, pers. comm.). Apparently this form is distributed from inland Victoria and South Australia to mid-coast of Western Australia (Dongara near Geraldton) where an *Adriana* sp. (either *quadripartita* (Labill.) Gaudlich or *tomentosa* Gaudlich?) grows but where so far only one specimen of *albocincta* is known. Nothing is known of the habitat or life history of (4), but *A. tomentosa* grows widely around Dampier (Kenneally, pers. comm.).

The puzzle about (1) has not been solved yet. The type locality, Peak Downs, does not appear to have salty inland lakes, although *Adriana glabrata* Gaudlich may grow there (Everist, pers. comm.); this plant is widely distributed in coastal, subcoastal or mountain areas of Queensland and N. S. W. No *albocincta* specimens are known from these areas except for *albocincta* syntypes and the non-verified specimen from "N. Queensland" mentioned above.

Theclinesthes hesperia sp. n.

T. hesperia hesperia subsp. n. (Figs. 31, 52, 157)

Types — *Holotype* ♂, AUSTRALIA: Western Australia, labelled "W. A. Bunbury 7. xi. 1974 C. G. Miller/[on the back] S1138 Scale" in Australian National Insect Collection (Registered Type No. 3284); *paratypes* 94♂ 61♀: Bunbury 5♂ 1♀ (3., 15., 19., 30. iv.) 1♀ (x.) 3♂ (30. x.) 11♂ (xi.) 21♂ 13♀ (xii.) 1929, 1♂ 2♀ (i.) 1♂ (24. i.) 1♀ (8. ii.) 1♂ (13. ii.) 5♂ 4♀ (7., 9., 26., 28. iii.) 20♂ 4♀ (6., 7., 13., 15., 19., 25., 26., 27., 28., 29. iv.) 1♀ (8. xi.) 1930, 1♀ 15. xii. 1938, 1♀ (8. iv.) 2♂ 6♀ (8., 15., 26., 28.) xi. 1939, 1♂ 15♀ (5., 6. xi.) 1♂ (xi.) 2♀ (8., 16. xii.) 1940, (F. L. Whitlock) AM, to be deposited in BMNH (2♂ 2♀), USNM (1♂ 1♀) and ZMB (1♂ 1♀) - 2♀ 2., 7. x. 1961 *FP* ANIC - 4♀ ix. 1967 (J. C. Le Souëf) *LS* (2♀) and *AS* (1♀), 1♀ to be deposited in ANIC - 16♂ 1♀ 7. xi. 1974 (C. G. Miller) *AS*, to be deposited in *JK* (1♂), *RG* (1♂), ANIC (2♂), CM (1♂), NMV (1♂) and OM (1♂) - 2♂ 19. xii. 1975 (D. F. Crosby) *DC*; Yulgorup National Park N of Bunbury 2♂ 1♀ larvae on *Adriana quadripartita* 28. xiii., pup. 3. ix., emerg. 15. ix. 1975 (K. Wright) *AS*; Mandulah 1♂ 10. xi. 1938 (K. R. Norris) AM, 1♂ 11. xii. 1963 *FP* ANIC; Madora Bay 1♀ 13. x. 1974 (S. Wallace) *AS*.

Holotype (Fig. 52) — ♂ summer form, 13 mm; forewing broader and apex less pointed than in *T. albocincta*; above somewhat dark blue-lilac with narrow black terminal band which is fused with caudal and terminal spots on hindwing like in *T. onycha*; veins and forewing cell-end bar finely black; no subterminal lunules; Cilia termianlly very finely white or whitish, otherwise brown on both wings; tail stubby with no white tip; beneath grey brown, bands slightly darker than ground

colour with dark linings but white linings faintly visible only on forewing; postdiscal suffusion grey and extensive, especially on hindwing where it spreads over most of the wing except brown areas between postmedian band and cell-end bar and simliarly coloured subterminal areas caudad of M_1; subterminal sagittate spots rather weak on both wings; terminal and caudal spots obscure on hindwing. *Androconia* (Fig. 157) fairly abundant; elongate but smaller than those of *miskini* (*s. str.*), tip slightly convex at the middle, with 12 ribs having fairly large nodules.

Paratypes — ♂ summer form, 9-16 mm, mostly 12-14 mm; above sometimes radial wedge-shaped dark shade protruding basad from termen in each spaces on forewing; cell-end bar on forewing sometimes strongly marked; sometimes light suggestion of pale subterminal lunules on both wings; beneath ground colour sometimes slightly yellowish; band are sometimes lined strongly by dark brown on hindwing. *Androconia* usually more slender than in holotype and very easy to distinguish from those of *miskini*. ♀ summer form (Fig. 31), 11-15 mm; rather similar to *albocincta* ♀; forewing somewhat narrower and less pointed than in ♂, forewing broader and ground colour above darker than in *albocincta*; blue areas more intensely coloured, sometimes a little shiny, covering distad of well marked cell-end bar and not becoming paler apicad on forewing; terminal spots and pale lunules marked clearly as in *albocincta*; beneath as in ♂.

This taxon has long been confused with sympatric *T. miskini msikini* form (4). Actually it is more closely related to *T. albocincta* but can be distinguished therefrom by its brown non-chequered cilia, broader and less pointed forewing, tail without the white tip, extensive dark blue-lilac colour above in ♂ and reduced white linings of the bands beneath. A peculiar feature of *hesperia* (*s. str.*) is the occurrence of small elongate androconia which distinguishes this taxon from *albocincta* and *hesperia littoralis* n. The ♂ of this taxon also resembles *onycha* (*s. str.*) ♂ but may be distinguished from it by its narrow and smaller androconia, stubby tail, well marked forewing cell-end bar in the ♂ and somewhat yellowish paler underside.

The specific name *hesperia* is the Latin adjective (feminine) meaning "western".

Distribution, habitat and life history — So far it is known from south of Perth (Madora-Mandulah area) southward to Bunbury, W. A. Its larvae were found on *Adriana quadripartita* (Labill.) Gaudlich and bred to adults (K. Wright, pers. comm.) but details of the early stages still remain to be recorded. In Bunbury it is apparently common, ♂ ♂ hilltopping, possibly together with *miskini* ♂ ♂, on sand dunes near the coast where the above food plant has been recorded in the W. A. Herbarium.

T. hesperia littoralis subsp. n. (Figs. 53, 110-113)

Types — *Holotype* ♂, AUSTRALIA: Western Australia, labelled "ESPERANCE, WA. 27. DEC. 1975 D. F. CROSBY" in Australian National Insect Collection (Registered Type No. 3285); *paratypes* 18♂ 14♀: Esperance 5♂ (13.) 7♂ 3♀ (14.) x. 1967 (J. C. Le Souëf) *LS* (5♂ 1♀) and *AS* (2♂ 1♀), to be deposited in ANIC (1♂ 1♀), BMNH (2♂ 1♀), CM (1♂) and USNM (1♂) - 6♂ 11♀ 27. xii. 1975 (D. F. Crosby) *DC* (5♂ 9♀) and *AS* (1♂ 1♀), 1♀ to be deposited in ANIC.

Holotype (Fig. 110) — ♂ summer form, 13 mm; similar to *hesperia* (*s. str.*) in wing shape, size and general pattern, but different in the following points: above somewhat pale dark brown, dull blue scales on proximal 2/3 of caudal half of forewing and proximal 3/4 of hindwing between M_1 and 1A+2A leaving veins dark; a broad cell-end bar on forewing and most of terminal spots on hindwing buired in ground colour; caudal spots small but discernible; faint pale lunules between M_3 and CuA_2 in subterminal dark band; cilia brown; beneath light brown, darker than in *hesperia* (*s. str.*), bands slightly darker than ground colour with dark linings but white linings faint or absent; postdiscal suffusion greyish but slight and present only on hindwing; cephalic half of hindwing on postmedian band and basad slightly darker; subterminal sagittate spots present but terminal spots absent except very weak caudal spots on hindwing; both wings, and especially hindwing, basally suffused with black; no androconia.

Paratypes — ♂ 11-15 mm; blue area varies slightly in its extension, sometimes confined in postbasal area on forewing and caudal half on hindwing; forewing cell-end bar well marked when blue area is extended beyond it; pale lunules variable, obscure in darker specimens; beneath sometimes very dark in spring brood (Fig. 53); bands sometimes concolorous with ground colour, becoming less conspicu-

ous; postdiscal greyish suffusion sometimes almost absent. ♀ 12-14 mm; blue area as extensive as in ♂; pale lunules on hindwing slightly more conspicuous than in ♂ but much weaker than in *albocincta*; beneath bands in some spring brood specimens (? wnter form) very dark (Fig. 113); cilia sometimes with some suggestion of chequered appearance but mostly brown on forewing, but lighter coloured portions never pure white; otherwise as in ♂.

This taxon is distinguished from *hesperia hesperia* n. by its restricted blue area without violet tinge in ♂, darker underside in both sexes and the absence of androconia; from other taxa of the complex it may be distinguished by the absence of androconia, general dark appearance, dark non-chequered cilia and stubby tail on hindwing and the weakly developed white linings of the bands beneath.

The subspecific name is the Latin adjective (feminine) meaning littoral.

Distribution, habitat and life history — So far known only from the coastal area of Esperance, W. A., inshore side of sand dunes along the beach only 50 m from the waterfront, flying around *Adriana* sp. (*A. quadripartita* is the only recorded *Adriana* species from this locality at the W. A. Herbarium), which grows in profusion in the area (J. C. Le Souëf and D. F. Crosby, pers. comm.). Early stages are unknown, but there is little doubt that it feeds on the *Adriana* plants.

Comments — *T. hesperia littoralis* may be distributed along the south coast of Western Australia towards both east and west of Esperance, but whether or not it is continuous to, or even at some localities sympatric with, *albocincta* and/or *hesperia* (*s. str.*) is not known, because of the complete lack of information about their possible occurrence along the long, mostly deserty coastline between Esperance and Eyre Peninsula, South Australia, and between Esperance and Bunbury in Western Australia. So far we have never seen ambiguous specimens of *littoralis* or *albocincta* which can not readily be distinguished from each other. In any event, there is little doubt that *hesperia* (*s. str.*) and *albocincta* have reached the status of separate species, despite the possibility that they are clinally continuous along the south-weatern coast of Australia. In spite of the absence of androconia, *littoralis* is obviously closer to *hesperia* (*s. str.*) than to *albocincta*. We have therefore treated *hesperia* and *littoralis* as a species distinct from *T. albocincta*.

The species *T. hesperia* thus defined now forms another example pointing to the specialisation of the south-western corner of Western Australia as a separate ecological and evolutionary area from the rest of Western Australia. There seem to be a number of butterfly taxa confined to this area like *T. hesperia*, but the apparently complete exclusion of the widely distributed species *T. albocincta* from this area, replaced by *hesperia*, has fewer parallel examples in butterflies and is therefore more remarkable.

The relationship of *T. albocincta* to the rest of the *T. onycha* complex is another interesting problem. The presence of androconia only in *hesperia* but not in *littoralis* may pose a certain restriction to the possible origin of the former, because it is unlikely, although not impossible, that androconia of *hesperia* have evolved again from an ancestor lacking androconia. Therefore, it may be inferred that *Theclinesthes* was once spread over southern Australia when the continent was more humid (see, for example, Raven & Axelrod, 1972). *T. hesperia* might be the relic of a taxon which occurred then and there. *T. albocincta* could have evolved later through an ancestor common to *littoralis* upon drying up of the most of southern Australia in post-Miocene or even post-Pleistocene, and they might have lost androconia in this process. It is of interest that some specimens of *T. miskini* (*s. str.*) occurring in dry areas are also nearly or totally devoid of androconia. In this connection, *T. albocincta* seems to form a transition from *T. onycha* complex to *T. serpentata* complex which lacks androconia. Interestingly enough, the two species of *serpentata* complex, *T. serpentata* and *T. sulpitius* feed (Common & Waterhouse, 1972) on another group plants (Chenopodiaceae) which are, like *Adriana*, capable of adapting to salty soil, ranging from the sea shore to the dry inland. They have, like *albocincta*, narrower forewings, very short tails, clearly chequered cilia, and predominantly dark upperside. These points also clearly indicate the affinity of *T. albocincta* to *T. serpentata* complex. Indeed, we illustrate one small ♀ specimen (Fig. 105) of *albocincta* which is rather reminiscent of *T. serpentata*.

Correction — In sections of types and material, records with asterisks should be referred to the collection of D. P. Sands rather than ANIC as indicated.

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